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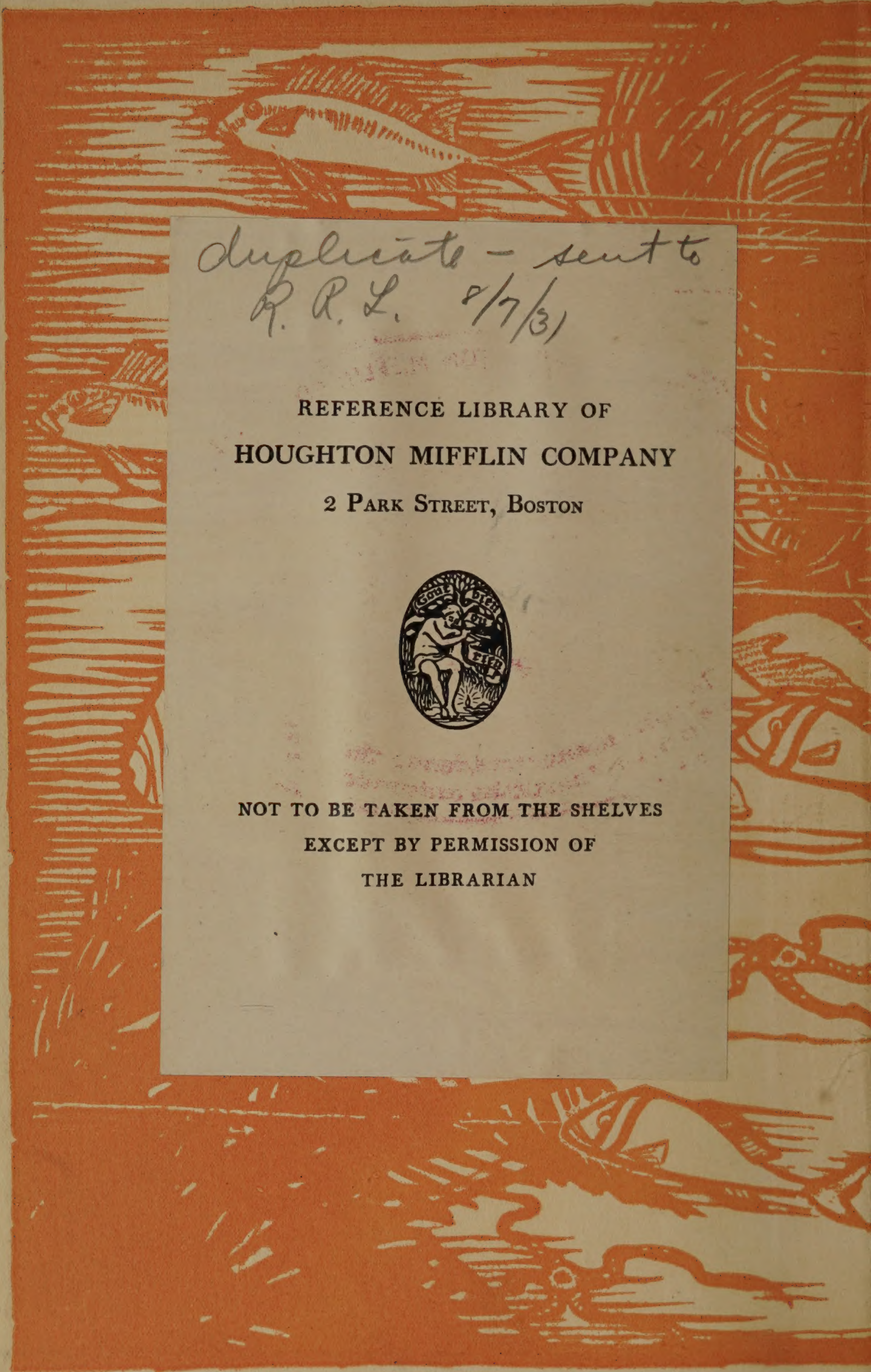

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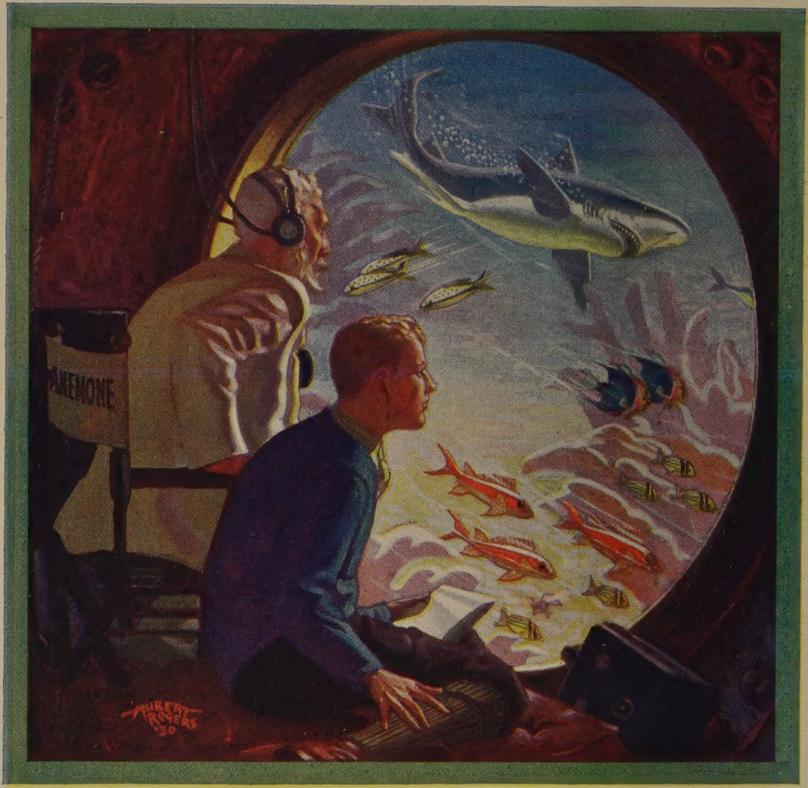

A GLIMPSE INTO AN ENCHANTED WORLD

OPENING DAVY JONES'S LOCKER

A Boy Explores the Bottom of the Sea

By
THAMES WILLIAMSON

WITH ILLUSTRATIONS BY
HUBERT ROGERS

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FOR

MY THREE NEPHEWS

MERTON, CARROLL, AND PAUL LEEMAN

I AM sitting on the bottom of the ocean. I am deep down under the water in a place where no human being has ever been before. It is one of the greatest moments of my whole life.

WILLIAM BEEBE

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OPENING DAVY JONES'S LOCKER

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CHAPTER I

TEN BOYS AND A TEST

In the city of Baltimore there is a street called Wolfe. At its lower end this street turns and comes to a halt upon a wide wharf, facing the harbor. It was a busy place. The only idlers in sight were ten boy scouts, standing in a group near one of the piers, and gazing out over the water. The June morning was still young, and the harbor waves were dancing in the sunlight, so that for a time they were content merely to look at them.

Nevertheless, these ten boys were not really idling there on the wharf. They seemed to have a reason for being where they were, for as the minutes went by they became a little restless, and kept looking about as if expecting some one. Each was dressed in regulation scout uniform, and all appeared to be somewhere between fifteen and seventeen years of age.

'Here's Mr. Bingham now,' said one of them suddenly, and jerked his head toward the city. A man in uniform came walking toward them. He was their Scoutmaster.

'Good-morning, fellows.'

'Good-morning, sir.'

The Scoutmaster looked at his watch. 'That launch ought to be here by this time.'

Scarcely had he spoken when the *pop-pop-pop* of a gasoline engine came to their ears. A white launch was pushing toward them from across the water, and in another minute it was bouncing around at the bottom of the wharf.

'Is that Mr. Bingham?' the boatman called up.

'I'm Mr. Bingham,' returned the Scoutmaster briskly. He sent the ten boys down the ladder and into the launch, then he himself scrambled aboard. The quarters were snug for so many passengers.

'Look straight ahead, and off to port a little,' said Mr. Bingham presently, 'and you'll see the Anemone.'

Every boy turned to look, but not one of them said a word. Out in the middle of the crowded harbor a slender two-masted schooner rode at anchor, her riding sail fluttering as she rose and fell gently with the surge of the water.

'Do you fellows know where she got the name Anemone?' demanded the Scoutmaster.

'The anemone's a flower, isn't it?'

'Yes, but that isn't quite it. The sea anemone is an animal, but it looks a good deal like a flower, so that's where it gets its name. That schooner was named for the animal, not the flower.'

There was a general nodding of heads, yet none of the boys answered. They were looking at the Anemone.

'It's a good name for her,' continued the Scoutmaster, 'considering what they're using her for.'

Pop-pop-pop, pop-pop-pop-pop! went the energetic little launch, bringing them closer and closer to the schooner. They picked their way in and out among the fishing boats, passed a coal barge and a tug, and went on, heading straight for the Anemone.

By this time they could make out two figures on her deck, standing side by side and apparently waiting for the launch. One of the pair was an elderly man, with grizzled whiskers, and spectacles, and the air of being a scholar rather than a sailor.

'That's Professor Bradley,' announced the Scoutmaster. 'He'll be in charge of the expedition this summer.'

'Who is the other one?' asked some one.

Mr. Bingham studied the figure at Professor Bradley's side. He saw a man of perhaps twenty-six, athletic and clean-cut, with an attractive smile.

'That is Dr. Robert Mason,' said the Scoutmaster.

'A doctor?'

'Yes, but not a physician. An academic doctor. He's Professor Bradley's assistant.'

'Is he going on the trip?'

'I think so.'

There was no more time for talk. They had arrived at the broad high side of the schooner, and now the boatman was maneuvering his launch into position, so that they could board the Anemone.

'All right,' he said, after a little delay.

Mr. Bingham led the way up the ladder, followed by the ten scouts. The Scoutmaster shook hands with the two men, but the boys simply formed in line, facing the Professor and his assistant with clear expectant eyes and erect bearing.

'Well, Mr. Bingham,' said the Professor. 'You got them here on time.'

'Yes, I knew you'd want to have the matter settled.'

'Quite right.... So these are the candidates?'

The Scoutmaster nodded. 'Let me introduce them,' he began. 'The ——'

'Just a moment,' broke in the scientist. 'This ought to be done in orderly fashion. Mason, will you get their applications for me?'

Off went the Professor's assistant, and presently came back with a sheaf of papers. The scientist took them, adjusted his glasses, and fell to paging through them. Once he raised his head, to give the row of boys a searching look.

'Where are their merit badges — honorary emblems, and all that sort of thing?' he asked.

'I suggested that they leave them at home,' said the Scoutmaster. 'I didn't want badges to enter into your impression of them this morning.'

'H'm.'

'Each one of these boys,' continued Mr. Bingham, 'is a winner in an elimination contest, and that victory has entitled him to enter the present competition. I am very proud of all of them.'

'Will you introduce them?' said the Professor abruptly.

'Certainly. I'll name them from left to right. First, on the end, is Frederick Wilson, then Hans Parnell, Alexander Houser, Allen McLinton, Thaddeus Larkman, Seth Thomas, Edward Farnum, William Burke, James Muir, and Peter Brownell.'

Each boy saluted as his name was called. When the Scoutmaster had finished, there was a little silence. The scientist fidgeted with his glasses and cleared his throat, while the ten scouts swallowed in vague uneasiness.

'Young men,' said Professor Bradley at last, 'I am heartily glad to see you here. The Boy Scout movement is a splendid thing, and I only wish I could have been a member when I was a lad.... But that's not the point, is it?' and a twinkle appeared in his eye.

The boys relaxed a bit. Two or three of them ventured to smile.

'Briefly, the situation is this,' continued the Professor. 'This vessel, the Anemone, is the property of the Institute. The scientific equipment which she will carry is likewise the property of the Institute. I myself am in the employ of this organization. The same is true of my assistant, Dr. Mason.'

He waved his hand toward the young scientist, and went on.

'During the coming summer this vessel will be engaged in marine exploration. The larger part of the earth's surface is covered with salt water; yet we know relatively little about the wonders which that salt water conceals. To be sure, Science has been studying the problem for a great many years. Also, we have solved many mysteries, and we have learned many wonderful things about the bottom of the sea and what goes on there. But in spite of all this we are still woefully ignorant of our oceans. The grandest mysteries are yet to be solved. Very well, the Anemone will attempt to add something to our knowledge of the sea.

'This is a small vessel,' he went on, 'and of course our efforts will be limited accordingly. The Anemone is provided with sails, but most of her power will come, not from the wind, but from the engines which we have had installed in her. There will be very few people aboard the vessel this summer. Besides Captain Nordstrom and a combination cook and mate, there will be only three persons. One is myself, a second is Dr. Mason, and a third is one of you ten boys.

'One of you,' said the Professor, 'is to be chosen from among his fellows to go on this modest expedition of ours. As you probably know, this opportunity has been offered through the courtesy of the Institute, acting with the coöperation of the Boy Scout organization. The idea grew out of the fact that Commander Byrd took a boy scout to the South Pole with him, and our aim is a similar one — namely, to furnish some one boy with a unique type of education and experience.'

As he said this the Professor's lips tightened and his eyes became severe.

'Don't misunderstand me,' he hurried on. 'There will be fun and pleasure on this trip, but we are not going on a picnic, we are going on a scientific expedition. Whichever of you goes with us will have to work, and work hard, and work at a wide variety of tasks. In fact, he will be called upon to do almost anything, from helping about the deck to aiding Dr. Mason and myself in our technical labors. And there will be no wages. You will get your food, a fairly comfortable place to sleep, and a never-to-be-forgotten experience, and that is all. So perhaps you may be sorry that you bothered with this competition, after all. I wonder.'

The ten scouts returned his smile, but not one of them wavered. Determination and the desire to win stood out clearly upon them.

'The duty of selecting one of you,' said the scientist, 'rests upon me, and upon me alone. I am rather sorry about that, simply because it is a difficult matter to make such a choice. I have gone over your application papers carefully, and now I see you personally. Very well, I shall announce my decision before you leave the ship. It will all be very informal, because I already have some notions on the subject, and I have only to estimate each of you on the basis of appearance and personality, and then reconcile the result with what I gleaned from your application papers. My aim, of course, is to choose the best all-round man for the particular purposes of the expedition. That's quite the proper thing, isn't it, Mr. Bingham?'

'Yes, indeed.'

The Professor began to rub his fingers into his stubby gray beard.

'Well, boys, I've said enough, I think — for the present, anyhow. Suppose you relax a bit. Look the vessel over and ask Dr. Mason to explain anything that interests you and you don't understand. Go below, if you like, and so forth. In short, I want you to make yourselves at home for perhaps a half-hour, while I talk to your Scoutmaster. That's all.'

With this he turned to Mr. Bingham, leaving the boys to fall out of line and stroll off on a sight-seeing tour of the Anemone. Dr. Mason obligingly went with them, and this enabled the Professor and the Scoutmaster to talk matters over freely. They discussed each boy in turn, comparing him with his fellows, and attempting to judge his powers and peculiarities. Professor Bradley kept a shrewd eye on the boys, asking questions and studying them from a distance, until at last he gave his head a decisive jerk.

'One thing more,' he said. 'I want to see how they act in the water. Would you mind calling them?'

Mr. Bingham called his scouts, and when they had gathered again, the Professor said to them:

'Whoever goes with us this summer will have to feel perfectly at home in and about water. He will have to know how to swim well, how to dive and float, and how to take care of himself generally when he is overboard. It is going to be a watery summer. Very well, I asked that you bring swimming-trunks along. Have you done that?'

'They have them on,' explained the Scoutmaster.

'Excellent. Then suppose you strip and take positions at the rail of the vessel.'

Without a word the ten boys stripped to their swimming-trunks. They went to the rail.

'Up on it!' exclaimed the Professor briskly.

They climbed up on the rail, balancing there like so many crows on a fence.

'When I give you the signal,' said Professor Bradley, peering over the rail to make sure that the water was not obstructed by anything dangerous, 'I want you to dive. After you come to the surface you can do what you please, so long as you move about until I ask you to come up. Swim, dive, float, play around, and so forth. Now get ready.'

The ten boys straightened up, their eyes shifting from the Professor down to the water and back again.

'Go!'

Down they plunged, skillful and full of grace. Cleaving the surface they swam under the water a moment and came up, spluttering and fanning their arms. At the rail above them stood Mr. Bingham and the Professor and his assistant, watching them as they rolled and plunged and beat the water.

'Which one is Muir?' asked the scientist. 'And which one is Farnum?'

The Scoutmaster told him.

'This is more important than your boys realize,' said the Professor presently, 'because I intend that the boy we take shall learn to use a diver's helmet and do a bit of exploring on the bottom of the sea. I didn't tell them that, of course, because I was afraid it might startle them and keep them from doing their best when they went over the rail just now. But you might mention the idea when you get our successful candidate alone. The beginner in deep-sea diving needs time to think about it first.'

'Thank you, I will.'

'All right, boys!' called the Professor. 'Come up, now.'

The scouts swam to the ladder and came swarming up on deck, the water dripping from their clean, firm bodies. Mason took them below to rub down, and a few minutes later they were dressed and back in a line before Professor Bradley and their Scoutmaster.

Mr. Bingham held up his hand for attention.

'Fellows,' he said gravely, 'Professor Bradley has made his choice, but before he announces it I want to say just a word.... I want to remind you that you are picked scouts. There is not one of you who has not won many honors. There is not one of you who has not been tried and proved in many ways. You have learned how to be good losers. And so I want you to accept Professor Bradley's decision with good sportsmanship. In other words, be scouts!'

He stepped back. Professor Bradley cleared his throat. The boys looked him straight in the eye.

'Young men,' he said quietly, 'as your Scoutmaster has just told you, I have made my choice. It has been a difficult thing to do. But since I have been compelled to settle upon one, and only one, of you, I have done so. We shall take with us this summer Mr. Edward Farnum. Will he come here, please.'

The third scout from the end of the line stepped forward, flushing a deep red. He was tall and vigorously made, with brown hair and hazel eyes that were shining strangely just now. The boy lifted his hand to salute, but Professor Bradley took it and shook it heartily. Whereupon the Scoutmaster and the winner's nine companions broke into hearty applause.

CHAPTER II

THE EVE OF A GREAT ADVENTURE

THE next day was Wednesday, and Ted Farnum long remembered it as the busiest Wednesday he had ever known. The Anemone was due to sail in the evening, at eight o'clock. All the morning he telephoned friends, ran over to the neighbors to tell them good-bye, and hurried back to the house to pack. His mother had put aside the clothes he was to take: Six handkerchiefs, four changes of underwear, socks, three flannel shirts, an extra pair of shoes, and similar articles. These and a few cakes of soap, together with toothbrush and toothpaste, were all that he needed, he said. Hurriedly he packed them in his suitcase.

'Who will do your washing?' asked his mother.

'Your son Ted,' laughed the boy. 'We'll be out on the water by ourselves, so when our clothes get dirty we'll just wash 'em, the way sailors do.'

She smiled at him. 'You're anxious to get started, aren't you?'

'Am I! I think I —— Wow! see what time it is! Isn't Dad coming home to lunch?'

'Yes, he'll be here any minute. I'll get things on the table.'

The boy shut his suitcase, locked it, and set it near the door. Presently his father arrived, and they had lunch. His parents asked questions and gave him quiet, sensible advice, but they showed no signs of anxiety. They knew their son to be both capable and trustworthy, and they were willing that he should go. They said good-bye and watched him stride off with his suitcase.

He boarded a street-car to the city and sat back with a contented little sigh. Dr. Mason was to meet him at the wharf at three o'clock, and three o'clock was still an hour and a half away. That would give him time to have a good talk with Mr. Bingham. The Scoutmaster would be waiting for him at Patterson Park, according to their agreement of the day before.

'Patterson Park!' called the conductor. 'Patterson Park!'

The boy jumped up and got off the car. Mr. Bingham was waiting for him, and, as soon as they had checked the suitcase at a near-by drugstore, they set off for a walk and a chat in the cool park.

'Are you over your surprise yet?' said the Scoutmaster.

'No, not yet,' was the answer. 'I didn't have any idea I'd be the one. I thought perhaps Fred Wilson would get it, or maybe Jim Muir.'

'Well,' said the Scoutmaster, 'one of them might have got the place if it hadn't have been for you, Ted. All in all, I agree with the Professor. You're the best fellow for what they want, and I'm glad you're going. I know you'll be a credit to us all.'

The boy answered gravely, 'I'll try my best, sir.'

'You might drop me a line,' said Mr. Bingham suddenly, 'and tell me how you like the bottom of the ocean.'

'What's that?'

'I mean it. Professor Bradley intends to give you a chance to put on a diving outfit and go to the bottom.'

Ted stopped short in his tracks, his eyes fixed upon the Scoutmaster in a wide stare.

'Go down to the bottom!' he repeated. 'Oh, I — I couldn't do that.'

They walked slowly on.

'Why not?' asked the older man.

'Because I don't know how.'

'You can learn.'

'I don't know about that.'

'You've never tried it.'

The boy nodded. 'You're right, I haven't. I've had a good deal of experience in just — well — just ordinary diving, but I've never even seen a regular deep-sea outfit.... Do you really think Professor Bradley would let me try a thing like that?'

'That's what he said. Of course you'll break in on it by degrees. Probably you'll go down in fairly shallow water, with Dr. Mason. Keep the idea in mind, Ted, but don't let it bother you.'

'Maybe,' the boy murmured, and absently sat down on a bench, 'maybe.... Only it sounds so queer.'

The Scoutmaster took a seat beside him, laughing heartily.

'Queer! That's not a very appropriate word, Ted. Wonderful would be better. Wonderful, or marvelous, or fascinating, or mysterious — some such word as that. Just imagine what it means! Think of having a chance to see all the amazing things that live at the bottom of the ocean! I tell you this summer is going to introduce you to a regular fairyland! Didn't last night's newspaper refer to you as the luckiest boy in Baltimore? The best that most of us can do is to go to the library and read one of Beebe's books, but you're actually going to see those things. By the way, do you know where the Anemone is going?'

The boy straightened up. 'No, I don't, and everybody's been asking me. All I can find out is that we're going south.'

'Professor Bradley didn't tell me the exact place,' said the Scoutmaster, 'but I infer that your destination is somewhere around the West Indies, or the Gulf Stream area. At any rate, it's the tropics.'

'Why should we go to the tropics rather than somewhere else?'

The Scoutmaster smiled. 'Well, I know that, even if I'm not a member of a scientific expedition! The

Anemone's bound for the tropics because that's where you find the greatest amount of marine life, and also the greatest variety. And besides that, there are places down there where the sea is comparatively shallow; there are all sorts of wonderful animal and plant growths within a few feet of the surface, and the water is so clear that it's fairly easy to study it. Professor Bradley even tells me that he intends to take pictures under the sea, without artificial lighting.'

'You don't mean photographs?'

'Yes. That's nothing new. Scientists have been making submarine pictures for a number of years now. You'll probably have a hand in some of that sort of photography before the summer's over.

'Oh, by the way, I want to tell you something, before I forget it,' exclaimed the Scoutmaster. 'It's about your two — employers, I suppose you'd call them. Professor Bradley is in charge, of course. Well, you'll find him rather odd. He's getting along in years, and his health is none too good. Sometimes he may seem abrupt, or critical, but do your best and say nothing. Don't bother him any more than you can help. If he invites your confidence, all well and good, otherwise do most of your talking with Mason. I think you'll like Mason.'

'I like him already.'

'Good. I'm glad to hear it. You'll like Professor Bradley, too, but naturally he's very busy, and then, besides, Mason is more your own age. He's human and full of fun, I think. I hope you and Mason will be good friends by the time you come back. — Well, it's twenty minutes of three. You'd better be going.'

They rose and walked back to the drugstore. A street-car came along. The two shook hands.

'Don't forget to write me,' said the Scoutmaster.

'I won't. And thank you for being so good to me.'

The car stopped, and a moment later Ted was on his way toward the wharf. It was only a few blocks, so that he arrived before his watch said three o'clock. A minute or two of waiting and he saw Dr. Mason in a motor-boat, rapidly approaching the wharf. The young scientist made the boat fast and ran up the ladder with a spryness that astonished Ted Farnum. Then he came up to the boy, his hand extended and his eyes smiling.

'My name is Mason. I'm Professor Bradley's assistant.'

'How do you do, sir,' answered the boy. 'I hope I'm not late.'

'No. In fact you're early, because we've got to take some supplies back with us. I think this is our man coming.'

A truck drove up with a dozen boxes marked for the Anemone. Ted threw off his coat and helped get them off the wharf and into the motor-boat. Then he climbed down the ladder and they set out for the schooner.

'This is all laboratory stuff,' explained Mason, jerking his head toward the boxes. 'That case you're sitting on is full of slides for the microscopes, and this big one between us has glass plates for some new aquaria.'

'It isn't very heavy.'

'No. It's chiefly excelsior and sawdust. Most of our supplies are aboard. There's another boat unloading, though. That man on deck with the blue cap is Captain Nordstrom, and the colored man in the boat is Joe. This Joe is a little of everything — cook, crew, diver's assistant, and anything else that we need.'

The boat had turned to follow Mason's pointing finger. A small freight boat lay alongside the Anemone, her supplies in the process of being hoisted to the deck of the schooner. Mason shut off his engine until the unloading was over and the freighter had chugged away, then he steered up to the ladder. Captain Nordstrom, a silent square-faced Norwegian, let down a crane.

'Where's Professor Bradley?' asked Mason.

'Still ashore,' said Nordstrom briefly, and began to lower boxes and bales into the hold of the vessel.

Mason strolled about the deck, checking packages and sometimes asking the boy to turn a box over on its side so that they could see the mark. Apparently supplies had been arriving all that day, for the deck was so thickly strewn that they could hardly make their way about. There were casks, there were bundles done up in burlap, there were boxes of every size and description, and there were large crates, carefully braced, and marked 'FRAGILE' in great red letters. Ted had never stopped to think that a summer's cruise must necessarily require both a great amount and a great variety of equipment, so he was astonished at what he saw there on the deck. He recognized such totally different things as beans and electric-light globes, bottled chemicals and metal ladders, tents and thermometers, and then he gave up the idea of keeping track of them.

'Here are our four new cameras,' said Mason.

'That's a good many cameras, isn't it?' said Ted.

'Oh, we'll need them. You see, they're meant for different types of work, and then of course we have to take along one or two extra ones. We have seven, altogether.'

'Seven!'

'Um. These four are new, and we have our three old ones already stored away below. We'd better go down there now, so I can finish this checking-up job.'

They climbed down into the hold of the schooner, descending by means of a wooden ladder. This part of the vessel was odorous and rather dark, but in a few moments the boy was accustomed to it, and gazing about curiously. Here there were more boxes and bales, most of them neatly piled away by the colored man whom Mason had spoken of as Joe.

'Howdy do, Mistah Mason,' said the darky, and went on tugging at a crate that Captain Nordstrom had just lowered from the deck.

'Hello, Joe. Stop a moment and look at this young man. This is Mr. Edward Farnum. He's going with us.

And see that you give him enough to eat, because we want him to be strong enough to do a lot of work.'

Every one laughed at that, Joe loudest of all.

'My, my, my!' he chuckled. 'Ah's goin' do dat, Mistah Mason, Ah certainly is. We got such small numbah helpahs on dis boat, we sho' all of us got to work hard, no question about dat. But say, Mistah Mason, you better go over da' an' look at dat divin' ap'ratus, or whatever yo' calls it. Ah think it's busted, fo' sho'.'

Mason hurried to investigate. The box containing one of the diving outfits had broken open, but the contents were intact.

'This is one of our diving helmets,' said the young scientist, and pulled away the packing to show Ted a round steel shell, with a hole in one side.

The boy did not answer. He merely nodded, wondering in his heart if this helmet would ever rest on his own shoulders, at the bottom of the sea.

But there was no time to dream. The afternoon was slipping away, and there was still a great deal to do before they were ready to sail. They went on with their checking, Mason marking each item off his typewritten list as he found it. Captain Nordstrom sent down the last of the boxes, then without a word he descended the ladder and fell to helping Joe store them away. The Norwegian was a man of little speech, as Ted was to discover before the summer was over.

At last Mason was satisfied that everything had arrived. 'Except the dynamite,' he added, 'and the Professor will bring that.'

'Did yo' say dynamite?' demanded Joe, showing the whites of his eyes. 'What yo' goin' do, Mistah Mason, blow us all up to Kingdom Come?'

'Maybe,' said the scientist, giving Ted a wink. 'We've got to have some excitement some way, and we may get so sick of being out on the water we'll be glad to blow things up.'

'No, *sah*,' was Joe's emphatic reply. 'I'se not goin' git dat sick of de ole 'Nemone. No, sah, and Ah don' see no use fo' dynamite, anyhow. Ah been goin' on dese expuhditions five years now, and Ah don't 'member no dynamite befo' now. Ah bet yo'...'

The Captain had gone up the ladder, and now Mason and Ted turned back to have a last look at things in the hold, leaving Joe to stand and wipe his perspiring face, and talk to himself about the dynamite.

'What's that?' asked the boy smilingly, and pointed to a huge steel globe, some five or six feet in diameter. 'It looks as if it might be a diving helmet for a giant.'

'It does, doesn't it?' chuckled the other. 'And it's hollow, too.'

'What is it for?'

'It's an observation chamber. We lower it to the bottom, and the Professor goes down in it to make various observations. You'll be getting into that thing in about a week.'

At this point they heard Joe's voice again.

'Another thing Ah don' understand, an' dat is dis: Why yo' takin' so much fishin' tackle? Mah goodness, Mistah Mason, yo' got enough nets an' seines an' trawls an' hooks in dis hold to ketch fish fo' forty thousand people.'

'Joe, you'd better go throw some supper together. It's getting time, and you want to make a good impression on Ted here. Run along now.'

The darky turned to the ladder and began to ascend, still mumbling, 'All right, Ah'll do dat, but Ah tell yo' right now...'

Presently Mason and the boy followed him up the ladder, to find the Captain making ready to weigh anchor. The deck was clean. Another half-hour and the sun would be down.

'Let's take advantage of the light to give you an idea of our living arrangements,' suggested the young scientist. 'Come this way and I'll show you our temporary sleeping-quarters.'

He led the boy aft, and showed him the companionway which led below to what had once been the sleeping-quarters of the officers of the vessel.

'You say this is just temporary?' asked Ted.

'Oh, yes. After we get to our destination we'll put up tents on the deck, and sleep there. It'll be cooler, and much more convenient. There'll be other tents amidships, too, one for an office and another for our laboratory, and a smaller one for a dining-room.'

'Where does Joe do his cooking?'

'In the fo'c's'l, up forward. That used to be the kitchen and eating place when the Anemone was a fishing schooner, but since we took her over we use the fo'c's'l simply for Joe's quarters.'

A hail came to them from out of the twilight. It was Professor Bradley. They went to give him a hand up the ladder, and then very carefully they hoisted the dynamite he had brought along.

'Did the typewriters come?' was his first question, and when Mason said that they had he nodded and turned to the boy, 'You can use a typewriter, can't you?'

'Yes, sir.'

'Good. Well, Mason, tell Joe to give us something to eat and we'll be on our way.'

CHAPTER III

BEHIND THEM CAME A CERTAIN SHARK

As soon as supper was over, Captain Nordstrom started the engines and assembled his crew. It was a curious gathering — the Negro cook, Mason the scientist, and Ted Farnum, with Professor Bradley in the rôle of onlooker. Nevertheless they made up in willingness what they lacked in other things, and under the Captain's shrewd management it was no time at all before the jib and the foresail were up, and the men were hauling on the main halyards. Then the wind caught them, and the Anemone began to move.

Captain Nordstrom was at the wheel, guiding the schooner on her way out of the crowded harbor. Behind them and on either side the darkness was spotted with lights. Ted stood gazing about. That was the city of Baltimore back there, Baltimore and home.... Off to one side he saw the lights of other vessels, some of them coming in, others making their way toward the sea. Like the Anemone these vessels would slip down the Patapsco River, into Chesapeake Bay, and by morning they would have the broad Atlantic before them. After that they would fan out and go their separate ways, some to the North Atlantic ports, some to Europe, and some to nameless places....

He stood there until he was tired, and then he went below, to his bunk and sleep. When he awoke he could hear only the creak of the Anemone's mainmast and the pulsing of her engines. Beyond that there was a great silence. Evidently the sea was already showing them its vastness and its wide tremendous stillness.

After breakfast the boy cast a hasty look at the world of water into which the night's journey had brought them. The Anemone was working her way out to sea, before she turned south.

'Is there anything for me to do?' he asked.

'Not a thing, right now,' said Mason. 'The Professor's going up forward, to read some magazines, and I'm going to take the wheel while the Captain gets a bite of breakfast. So do anything you like.'

That was not hard work, doing as he liked. It was a fascinating experience merely to be on this vessel, to say nothing of anticipating all that was to come. Ted Farnum had never been out of sight of land before, and so for the first hour or two he was content merely to stand at the starboard rail and gaze to the west. There was land off in that direction, yet it was invisible, and when he shaded his eyes and stared he could see nothing but an expanse of water, shifting and glinting and endlessly rolling. He was actually upon the ocean, far from shore, and destined to be still farther.

Later on he strolled aft. Captain Nordstrom stood at the wheel, but since it was plain that he did not make a specialty of talk, Ted simply smiled by way of greeting, and passed on to where he could see the vessel's wake. The Anemone cut the water like a huge knife, leaving behind a path of foam which boiled and churned until the ship was far on her way. Now and then a bird flew across the water, but for the most part the scene was empty of life — until suddenly the boy saw, or thought he saw, a black something far behind the schooner and near the surface of the water.

This black something looked like a fin, and after he had watched it for a moment he said to himself that it was following the schooner. Occasionally it disappeared beneath the surface of the uneasy waves, yet always it reappeared, and always it was closer and closer to the stern of the Anemone.

'What are you looking at?' asked Mason, strolling up.

'I don't know, sir,' said the boy, 'but there's something out there that's following us, I'm sure of that.'

Mason's eyes settled upon the dark fin. 'That's probably a shark.'

'A shark! And he's after us, isn't he?'

The young scientist laughed easily. 'Oh, I wouldn't go so far as to say that. But he's following the boat, all right. I suppose he thinks that if he keeps it up long enough there may be something to eat in this neighborhood.'

'Ugh! I'd rather catch that villain than feed him. Or can't they be caught?'

'Yes, indeed.'

'Did you ever do it?'

'Now and then I've helped at it.... Want to try hooking this chap that's following us?'

'Could we, sir?'

'We'll try,' said Mason, and then he tried to look stern. 'On one condition.'

'What's that?'

'That you stop calling me "sir" or "Doctor." Of course I want you to say "Professor" or "sir" to Professor Bradley, just as I do, because his age and position call for those little niceties of respect. But as far as I'm concerned you can simply call me Mr. Mason, and forget the "sir." I think you and I can be informal, Ted, with perfect safety, especially if we're going to catch sharks together! Now let's see what we can find by way of fishing tackle.'

They climbed down into the stuffy hold, and there they poked about until Mason found a strong iron hook, used by Joe for lifting boxes and bales.

'What a fishhook that will make!' laughed Ted, for the iron was almost a half-inch thick.

'Big hooks for big fish,' was the retort. 'I'll file the end of this sharp, and you see if you can find a rope. It's got to be strong and it's got to be plenty long enough.'

The boy got the rope, and then by the simple process of tying it to the great hook it was converted into a fish-line.

'What will you use for bait?' asked the boy.

'I don't know. I've seen sharks caught with a small haddock or a piece of cod, but we haven't anything like that, so it'll have to be something different. Maybe salt pork would tempt him. Yes, you go ask Joe for about three pounds of salt pork. Tell him it's for me.'

Off dashed the eager boy, and back again with the meat. Mason jammed it onto the hook and lashed it on with twine, so that the shark could not easily pull it off.

'I hope he isn't gone,' observed Ted.

'Don't worry. He'll be there.'

Mason was right, for when they took their tackle to the stern of the vessel they could still see the dark fin, not more than a hundred feet behind them. Captain Nordstrom looked first at the hook, and afterward at Mason, then he faced front again, his hands clutching the wheel. Fishing for sharks apparently did not interest him.

Mason dropped the line overboard, and let it trail along near the surface. A moment or two of this and up flowed the shark, gray and silent and wicked. Yet he did not get the bait, for the scientist had jerked it up out of the water.

'Take a good look at him, before we start operations,' he told Ted. 'And look at that little fish with him, too.'

The boy gazed down into the water. 'Huh!' he exclaimed. 'There is a little fish with him, isn't there? I don't understand that. I should think the shark would eat him.'

'Never. That's his pilot.'

At any other time Ted Farnum would have asked what a shark's pilot was, but just now he was too excited over the monster himself. The great brute was idling back and forth at the stern of the schooner, easily keeping up with it, and apparently not interested in it. Even when Mason dropped the line again, the shark refused to pay attention.

'I don't believe he likes pork,' said the boy anxiously.

'Sharks like 'most anything,' the scientist rejoined. 'They're scavengers, you know. This fellow is merely taking his time, which is a shark's way. That's one good thing about these rascals; when you meet them down in the water, they're so deliberate that you have plenty of time to do what you want to do.'

'You don't mean you come across sharks when you're on the bottom of the sea, in your diving outfit!'

'Now and then, yes.'

'I should think they'd eat you; or is this all talk about sharks being man-eaters?'

'No, it isn't all talk, but it's usually exaggerated. You want to remember that there are all kinds of sharks — hammerheads, nurse sharks, mackerel sharks, and so on; and furthermore, you want to remember that what's true of one variety isn't necessarily true of the others. Some sharks are certainly tough customers, but others are so harmless that sailors have even ridden them, in shallow water.'

Mason chuckled at the thought, but the boy did not even smile.

'Are there any sharks where we're going?'

'Yes.'

'Did one ever tackle you when you were diving?'

'No; and I've never even heard of one of the natives being attacked. The average shark is a solitary fellow, and generally he's a terrible coward, besides.'

'That's good news,' said the boy, gazing down over the rail again.

The salt pork went bouncing along behind the vessel, but the shark seemed to be absorbed in other matters. He slipped back and forth, first on one side of the bait and then on the other, but never within a yard of it. Curiously enough, it was the tiny pilot fish that appeared to be interested. Back and forth dashed the little thing, smelling the bait and darting back to the great shark, for all the world as if he were reporting his findings.

'Notice how excited the pilot is getting,' said Mason. 'He suspects our chunk of pork.... Yes, but Mr. Shark is overruling him. The big fellow's going to investigate for himself. Too bad he can't take advice, because if he grabs that hook he's in for a peck of trouble.'

'If he only does,' whispered the boy, hardly daring to breathe. 'Think of catching a six-foot shark!'

'Six-foot!' scoffed his companion. 'If we get that thing up on deck, you'll discover that he's longer than that. The water's deceiving when you look down into it from above. Wait! He means business now. Jerk it away from him, until I get ready.'

With this Mason sprang to his feet and began straightening out the rope, after which he took a turn about a heavy wooden bitt that stood up from the deck like a short stout post.

'Keep your eye on him,' he called, 'and when he really takes the hook you tell me, and at the same time grab the rope and help me pull. I've got a half-hitch around this bitt, and that'll let us hold him. And be careful not to get tangled up in the rope.'

'I will,' answered the boy, and bent over the rail to stare at the shark. Around and around swam the monster, now nosing the bait, now seeming to decide that it wasn't worth eating. One minute succeeded another, and still he dallied.

'Is he still there?' asked Mason, for from where he stood he could not see into the water.

'Yes, he's still hanging around, but — oh, say! just a minute now.... He's going to do something... pretty quick, I think.... He's nibbling at it, and that little pilot fish is simply going wild, he's so afraid the big fellow is a goner.... Get ready now.... I... pull! He's grabbed it! Pull!'

In another instant they were both hauling away at the rope, Mason taking up every inch of slack by means of his turn around the bitt.

'D'you think we've got him?' cried the boy, puffing and pulling.

His companion tightened his grip on the rope, laughing a little. 'Got him?' he repeated. 'You don't think we'd have all this trouble hauling three pounds of pork out of the water, do you!'

'I guess you're right. He's getting heavier, isn't he?'

'That's because we're hauling him out of the water. Steady now, till I make this rope fast, and we'll have a look.'

He tied the rope, and then they went to the rail to see. There on the end of the line was the shark, with his blunt nose and solid powerful head, his cold, evil eyes fastened on them, and his horrible slate color suggesting a dead thing. Yet there was nothing dead about him, for though only his tail was still in the water he was still twisting and writhing, struggling mightily to get free of the hook. They could see into his maw, and make out the rows of cruel, shining teeth.

'Look at the size of him!' exclaimed Ted. 'Yes, I certainly made a mistake when I said he was a six-footer. He's more like ten!'

'Pretty good-sized shark,' admitted the other. 'Too big for us to handle alone, anyhow. Suppose you run forward and tell Joe to come.'

The cook shambled aft at Ted's heels, the whites of his eyes showing. Evidently the boy had not told him what was up, for when he had gazed over the rail he fell back with a startled shout.

'Mistah Mason, what yo' want to do dat fo'? Ah don't see why yo' want to fool with dat thing. Dat shark am bad business.'

'We caught him for you,' said the scientist, laughing. 'Didn't you say you'd soon be out of fresh fish?'

'Out o' which? Man, Ah may be out o' fish, but Ah don't figger on no shark meat fo' suppah! Good-*bye*, Ah got work to do.'

'Hold on!' cried Mason. 'You've got to help us haul him up. Give us a hand, Joe, and you can have his backbone.'

'Dat's dif'rent, Mistah Mason, dat's entirely dif'rent.'

Joe came back and laid hold of the rope. Mason and Ted joined him, and together they managed to bring the shark's head on a level with the rail.

'Finish him with that axe,' said Mason, nodding to the boy. 'Joe and I'll hold him. We can't take him on deck the way he is.'

Ted seized the axe and advanced. Taking careful aim he struck the shark a terrific blow with the blunt end of the axe. To his astonishment his weapon bounced back like a rubber ball, without leaving a mark.

'Come, take my place on the rope!' cried Mason. 'I'll tend to him. You used the wrong end of the axe.'

In another moment the athletic young scientist had plunged the axe blade into the shark's head, between the eyes. 'That's the end of him,' he announced.

But was it? They got block and tackle, and started the little gasoline engine to going, and by this means they managed to get the monster on deck, yet he was not done for. The instant the ropes slackened, his body began to thresh about like a demon, thumping with his powerful tail until even the stolid Nordstrom thought it best to move. Not until Mason had actually severed the brute's head did the fierce struggles temper down into quiverings and long-continued tremblings.

'Now, Joe,' said Mason, 'you can cut out your backbone.'

'Say, boss, Ah won't do no such thing *yet,*' chattered the cook. 'Dat shark he ain't daid, he's alive!'

'That's reflex action, Joe,' explained the scientist. But the colored man turned a deaf ear to him, and it was fully a half-hour before he would even get out his knife.

Meanwhile Professor Bradley had come to see what they had been doing. At his suggestion they measured the shark, and found him to be ten feet and four inches long.

'What a big brute!' sighed Ted. 'It makes me shiver just to look at him.'

'Big!' said the Professor, his face crinkling with good nature. 'Young man, there are no really big sharks any more.'

The boy gulped.

'All of the really big sharks,' continued the Professor, as he gazed out over the sea, 'passed out of existence long, long ago. The shark, it is worth noting, is a very ancient form of life, and we know that in prehistoric times there were some very large specimens in the sea. But not now, not now,' and he walked away, shaking his head.

Ted's eye returned to the dead shark. Apparently he was watching the cook slash open the tough body in the effort to get at the spinal column, yet his mind was busy with something else. He looked up at Dr. Mason.

'I've been trying to figure out what Professor Bradley said a moment ago. About sharks in ancient times. How do scientists really know that sharks used to be so much bigger than they are now?'

'Oh, that's a simple matter. We've found their teeth.'

'Teeth? Is that all?'

'In many cases, yes. For instance, right off there to the west on the Carolina coast different collectors have found large numbers of shark teeth. Similar teeth have been found in Florida, and still others have been dredged up from the bottom of the sea.'

'And they're not the teeth of modern sharks?'

'No. They've been identified as belonging to species that became extinct long ago, ages and ages ago. And as Professor Bradley said, many of those prehistoric forms were much larger than present-day sharks.'

'That's what I don't understand. How can science be sure that they were larger, if nothing but teeth have been found?'

'Why, because the teeth indicate something of the weight and general build of an animal. Some of those prehistoric teeth are six inches or more in length, and from this and other facts we infer that they belonged to gigantic sharks.'

'I see. I must seem dumb to you when I ——'

'Not at all. You're simply stumbling into a new field, Ted.'

'Mistah Mason,' broke in Joe, rising to his feet. 'Ah'm goin' to go get a sharper knife, but yo' won't throw dis shark overboard till Ah gets his backbone, will yo'?'

'No, I won't. And don't you throw him overboard, either, until I've opened the stomach, Joe.'

Ted watched the colored man hurry forward. All this talk of shark's backbone was mystifying him.

'What does Joe want it for?' he asked Mason.

'To make a walking-stick!' laughed the scientist. 'He'll put a wire down through the center, polish up each little vertebra, and go promenading with it on Sundays!'

'That's a wild idea!'

'Perhaps,' said Mason, studying the shark attentively, 'but it's everybody to his taste. Joe wants the backbone and I want the stomach, so why quarrel about it! We're both satisfied, and I think you will be, too, when we find out what this shark's been eating.'

CHAPTER IV

THE OLD GAME OF FIGHTING FOR LIFE

But Dr. Robert Mason was wrong, for his young friend was *not* satisfied when he saw what the shark had been eating. The contents of the monster's stomach astonished him, and interested him, but certainly his peace of mind was not increased thereby. Mason's demonstration of shark menu had only served to whet the boy's curiosity.

'Imagine there being twenty-three whole fish in that brute's stomach,' said the boy, as they sat on the deck the following afternoon.

'And in the biggest of those fish,' added the young scientist, 'there were smaller ones. The little fellows had been swallowed by their big relatives, and the big relatives were later on swallowed by the shark.'

'Then we came along and broke into the game,' nodded the boy. 'We sort o' evened things up by finishing Mr. Shark.'

Mason yawned and shook his head. The Professor was having a nap, but this method of passing time did not appeal to his assistant. When the younger man was drowsy, he preferred to talk it off.

'That last remark of yours,' he said to Ted, 'is not quite correct. What human beings do has relatively little effect upon life in the sea, you can be sure of that.'

'But think of all the fish we catch!'

The scientist shook his head again. 'Don't go getting any exaggerated ideas about human influence on the sea, Ted. Fish! Why, we don't catch many. With herring, for instance, Huxley actually estimates that the number caught by Man is only five per cent of the multitudes that are destroyed each year.'

'Whew! Then the herring tribe must have a lot of enemies, because I've read that we catch millions of them every season.'

'We do, but at the same time it's the whale and the porpoise and the seal and the shark and the cod and haddock and dozens of other fishes, not to mention the sea gulls and other birds, that destroy the great majority of the herring that lose their lives. The same is true of other fishes, too.'

'And we do only five per cent of the damage,' murmured the boy. 'Well, all I can say is that a herring must lay a lot of eggs, otherwise there wouldn't be any left, with so many enemies after them.'

Mason nodded. 'You're right. Only as a matter of fact the herring is rather a modest egg-layer. About 25,000 eggs is the limit for a herring.'

'What!' exclaimed the boy, sitting up in his chair. 'A fish that lays 25,000 eggs is a modest — er — producer! Heavens, how many does an ambitious fish lay?'

'A great many more than that,' laughed Mason. 'A female sturgeon lays about 635,000, and a halibut as many as 3,500,000.'

'Whew!'

'That's nothing. A cod has been known to lay more than 9,000,000 eggs. Imagine it!'

'I can't,' retorted the boy, with a short laugh. 'More than 9,000,000! What if all those eggs hatched and the young ones grew up! Has any one ever figured out what would happen *then?*'

'Um. If that kept up for a few years, all the other species of fish in the sea would be literally crowded out of the ocean. There wouldn't even be standing room!'

Ted settled back in his chair. 'I don't see the object in anything being so productive.'

'Oh, yes, you do. Think! You hit on the idea a minute ago when you spoke about evening things up, only you put too much Man in your answer. Nature's object is to preserve all her various types, and accordingly she measures a fish's power to multiply against the enemies of that particular species. A fish with a great many enemies must necessarily lay a great many eggs, so that after everything has taken toll there will still be enough mature fish to carry on the species.'

'I see. Many eggs, but few grown fish. That's the idea, isn't it?'

'Exactly. Take the cod, for instance. Less than five of our 9,000,000 eggs actually become adult fish, capable of producing more eggs. So you see what would happen if the female cod didn't lay that tremendous number of eggs.'

The boy's eyes roamed out over the restless sea. 'Where do the little fish go when they hatch?' he asked.

'Into the water.'

'Right out where their enemies are?'

'Yes. There isn't any place else for them to go.'

'What do they eat?'

'Tiny organisms of various kinds. Ultimately, of course, the basis is plant life.'

Ted did not understand this, whereupon the scientist explained.

'It's like this. The habit of a great many marine animals is to eat their neighbors. Big fish eat medium-sized fish, for instance, and medium-sized fish eat small fish, and small fish eat tiny fish, and so on down the scale. But this sort of thing tends to destroy *all* animal life, so what does Nature do? She provides an abundance of very small plant organisms which can live in salt water and furnish nourishment for millions of fish and other animals. That water that you see out ahead there is thick with those tiny plants, though of course you can't see them with the naked eye. You need a microscope.'

The boy got to his feet and walked to the rail of the vessel. He gazed down into what appeared to him as an empty waste of water, then without a word he came back to his chair.

'You say the water's thick with those things?' he asked.

'Very often it is. A single gallon of salt water may contain several million of them. But the point I wanted to make is that these microscopic plants supply the basic food for all the animals of the sea.'

'They must be a regular pasture for fish.'

'Now you're getting the idea, because scientists actually speak of the pastures of the sea. These multitudes of tiny plants use the energy of sunlight to manufacture such complicated types of nourishment as starch, then millions of tiny animals eat the plants, and after that it's a case of the bigger creatures devouring the smaller ones, and so on and so on, up to monsters like our shark. That's the meaning of those fish inside him, and the meaning of the fish that were in the fish that were inside him!'

'Then a newborn fish preys on tiny bits of life,' said Ted slowly, 'in about the same way that larger creatures prey on it.'

'Yes, it's the same kind of game, no matter whether you watch a shark after a twenty-pound cod or take a microscope and watch a baby cod battle with some tinier creature.'

An understanding light appeared in the boy's face. 'Mr. Mason, a microscope is a wonderful thing, isn't it! Why, it's a regular magic wand, to show all that.'

'A microscope,' said the scientist, 'is better than a magic wand. No sleight-of-hand performer could ever produce as many different things from a hat as a microscope can reveal in a quart of salt water. And what's more, the magician simply fools you and amuses you, whereas the microscope shows you things as they are, and in that way adds knowledge to entertainment.'

There was a long pause, during which neither of them spoke. Joe had taken the wheel, but save for his low crooning and the monotonous beat of the engines there was no sound. The Anemone pushed steadily on her southward way.

'Dr. Mason,' said the boy at last, 'I don't want to be a nuisance, but I wonder if you'd mind my asking another question?'

'Yes, I would,' was the scientist's unexpected reply; and then, as the boy turned to look at him, Mason went on smilingly, 'unless you stop calling me "Doctor"! Don't forget that again, will you?'

'I won't,' grinned the boy. 'I'm sorry.'

'Now for your question.'

'Oh, well, it was this. Are there any tiny animals swimming around on the surface of the sea besides young fish?'

'Good gracious, yes! Millions and millions and millions of them. Don't think that fish monopolize the ocean, will you? Of course in a way the fish is characteristic of the sea, but at the same time your young fish has all sorts of strange neighbors, and from the instant he's born, at that.'

'What are they?'

'Young sea worms, for one thing. Then there are little squids, crabs, lobsters, shrimps, prawns, starfish, jellyfish, sponges, polyps, and so on *ad infinitum*. The surface of the sea may be literally teeming with all these tiny creatures, swimming and tossing with the motion of the water, and trying their best to find something to eat.'

'And trying to keep from being eaten!'

'Oh, yes, that's the other half of the picture. Instead of "live and let live" the motto of our sea animal is "eat but don't get eaten."'

'But even at that most of them do get eaten, don't they?'

'Somewhere along the line, yes,' was the scientist's answer. 'The game begins as soon as they're born, and keeps up for various lengths of time. Millions of young creatures perish almost immediately, but others manage to escape death until they are half-grown, and a small proportion of lucky ones live on into what you might call old age.'

'It must be a fierce life.'

'Um. You know, Ted, a great many people think of a fish, for example, as a helpless, inoffensive creature, but he isn't. When you get a chance to observe things as they really are — say, at the bottom of the sea — just notice what a fierce hunter the ordinary fish is. Of course he has his enemies, but he's also a predatory animal.'

'I wonder if all fish are meat-eaters.'

'Most of them are. The average fish will not only eat raw meat, but practically everything else that he can get.'

The boy was thinking hard. It was an effort to realize that even small fish were hunters — fierce hunters, according to Mason.

'Every species of fish,' the scientist went on, 'has its own particular food needs, and also its own method of satisfying those needs. Fish even have their special hunting-grounds, and their hours or periods for going out after prey. In one way there isn't much difference between a land animal and a sea animal, because both of them go hunting and both of them risk their lives in the effort to get on in the world.'

'Listen, Dr. Mason,' exclaimed the boy. 'I — oh, pardon me, I mean Mr. Mason. I won't say that again, but I was thinking of C. G. D. Roberts and his wild-animal tales. He describes a lot of cases where one animal is stalking something, and another animal creeps up and kills the one that's been doing the stalking. I wonder if fish do that.'

'Yes, indeed. One fish may be racing after another, and this attracts a still larger fish, and this last fellow darts up on the pursuer and swallows him.'

'Think of it!'

'Did you ever feel a bite on your line and then haul it in and find that you had only half a fish left?' said Mason.

'Yes, I've had that happen.'

'Well, that throws some light on this business of hunting under water. A carnivorous fish seems to know the instant one of his neighbors gets in trouble, and so up he rushes, and if you've hooked something he may bite off a piece of it before you can haul it up.'

The boy had been waiting impatiently for Mason to come to the end, and now he spoke up, with eager, shining eyes.

'I think I know one difference between sea animals and land animals, though. Things like wolves organize regular hunting expeditions, but fish certainly don't go that far. Or do they?'

'Well, I don't know about that,' smiled the scientist, secretly amused at the boy's interest in the subject. 'But here is something that does happen. Sometimes a number of large fish of the same species catch sight of a school of very small fish. All right, what do they do? They move up on them, but many times they don't eat them, because they're too small. What the big fellows do is to use the little ones for bait.'

'How could they do that?'

'I'll tell you. They surround them, and herd them together, until they're in a compact mass. Now and then the big ones may take a mouthful, but their main object seems to be to drive the school along until it attracts the attention of a number of medium-sized fish. When the medium-sized fish dash up and begin to feed on the little fellows, up come the big ones and devour the eaters! In that way they get a square meal, whereas the little ones apparently wouldn't have satisfied them.'

'That's the queerest thing yet,' observed Ted, but the scientist laughingly shook his head.

'You'll see stranger things than that,' said he, 'before the summer's over. If you...'

He did not finish. The boy turned to look at him. Mason was gazing out upon the sea, his eyes narrowed.

'See those birds away off there?' he asked.

'Yes.'

'Well, they're furnishing you with another illustration of what we've been talking about. They're eating fish, and by the number of birds there must be a big school of fish there. Do you want to run below and get my binoculars? They're in my berth.'

'Sure.'

'Be careful and not wake up the Professor. He's probably still asleep.'

The boy slipped down the companionway, and in another minute he was back on deck with the glasses, a pair of powerful Zeiss binoculars which he promptly offered to Mason.

'You look first,' said the scientist. 'I've seen this sort of thing any number of times.'

'Thank you,' and Ted brought the glasses to his eyes and began to adjust them. '... A lot of excitement out there. Must be a thousand birds, diving and flying up and around. You'd better look now.'

Mason took the binoculars. 'Yes, that's what it is. It's a school of fish and those birds are after them. Aha! there's something else to that game, too. Take the glasses, Ted, and look carefully. See if you can figure out what it is that's making the fish jump up out of the water like that.'

Ted did as he was told, silently studying the far-away scene. It seemed to him, after a few moments, that the fish were being harassed both from above and from below. Hundreds of them went leaping up above the surface of the water, whereupon the ravenous birds of the air swooped down and scooped them up, swallowing them alive.

'There's something in the water that's after those fish,' said Ted, 'but I can't see what it is.'

'It's undoubtedly a number of larger fish,' declared the scientist. 'And there you have another angle of the old game of fighting for life. The big fish go after the little ones, and when the victims try to escape by leaping up at the surface the sea birds come at them. Down on the coast of Florida I've seen that same thing happen time and time again.'

Ted watched the battle for ten minutes, and then the steady southward push of the schooner made it difficult to see clearly. Very slowly he put down the glasses, his eyes filled with the wonder of what he had observed out there upon the ocean waste.

'It certainly is a struggle for life,' he murmured. 'Almost too much of a struggle. It's a mystery to me why this balance of Nature doesn't get out of order.'

'Now and then it does,' said Mason, yawning again. 'For instance, if the spring of the year is cold and overcast there'll probably be a scarcity of mackerel. And so on.'

'How's that? I don't get it.'

'Don't you! Why, I simply mean that those microscopic plants that we were talking about need sunlight, and if there's very little sun in the spring of the year, then there's relatively little plant food in the sea, and if that's the case there's not enough for the water fleas and other small creatures to eat, and in turn there aren't enough water fleas and so on for larger fish, such as mackerel. So a cold dull spring means few mackerel.'

'The mackerel would never die out altogether, would they?'

'I hope not,' laughed Mason, 'because I'm very fond of them. But seriously, I don't think so.'

'I wonder if any fish has ever died out completely,' said the boy, half to himself.

The scientist brightened up. 'Ever hear of the tilefish?'

'No, I never did.'

'Interesting case,' declared Mason slowly. 'The tilefish had always been plentiful along this coast, but about 1882 ship captains arriving in Boston and New

York and Philadelphia began to report a very strange thing. They said that on their way into port they sailed through miles and miles of dead tilefish. Altogether, I think, it was estimated that over seven thousand square miles of ocean were strewn with them, dead and dying. There must have been a billion at least.'

'But what could cause such a thing — lack of food?'

'No, apparently it wasn't lack of food. And, by the way, Nature's balance can be attacked through other elements than food. In this case, for example, the most plausible explanation is that a sudden drop in temperature along the northern edge of the Gulf Stream killed them, the tilefish being a warm-water species.'

'Did they become extinct?'

'No. They were thought to be, but years later they reappeared in great numbers, and now they seem to be as plentiful as ever.'

'That sounds queer.'

'Not when you understand Old Dame Nature,' protested the scientist earnestly. 'Her idea is to keep a balance between all her various species, and when for some reason one species is endangered to the point of extinction — well, it looks very much as if she knows how to safeguard the few that are left, until they're numerically strong again. Man is capable of destroying a land animal, but not a marine animal. Nature is too clever to permit that. I tell you, Ted, the ways of Nature are beyond understanding.'

The boy gazed out over the glinting sea, the shining, heaving, restless water over which the sinking sun was building a tinted path.

'I'm beginning to think so myself,' he murmured. 'But just the same I'd like to know more about Old Dame Nature's secrets, if I could.'

'You're going to do that very thing,' smiled the scientist. 'But meantime we'd better go see what the Professor is doing. He mustn't be allowed to sleep his life away like this.'

CHAPTER V

ON TO THE SOUTH AND THE CORAL REEF

STEADILY on and on pushed the Anemone, bearing to the southwest until she was close to the Florida shore, and then heading south again, straight against the warm peculiar current which is known as the Gulf Stream. It was apparent that they were coming into a milder region, yet when Ted Farnum gazed out over the water he saw whole flocks of brown pelicans, diving and feeding on the fish.

'It's the same old story,' said Mason, strolling up.

'Yes,' said the boy, and went on watching the great birds. He saw them go slowly flapping over the sea, until suddenly catching sight of a few victims below they wheeled and plunged downward, striking the water with a crash, and afterward rising up with their enormous pouches full of fish. A series of swallowing motions, and their breakfast was over.

On and on to the south went the vessel, until with the aid of Mason's binoculars Ted could make out land both to the east and to the west.

'That's Florida to the west,' the scientist remarked, 'and the Bahamas to the east. By the way, those islands are very interesting, because they mark the northern limit of certain important corals.'

'Corals?'

Mason gave the boy an appraising look. 'I suppose you know what a coral is?'

'It's an animal that looks like a plant, isn't it?'

'In a general way, yes. But that's not a very good answer, because corals are not the only animals that look like plants. Take the sea anemone, for instance.'

Ted said nothing. He was trying to remember what the Scoutmaster had told them about an anemone.

'You've got to know what corals are,' the scientist went on presently; 'and all in all I think the best way to get at the subject is to compare the anemone and the coral. All right, what's an anemone?'

'I really don't know,' stammered the boy, 'except that it grows in salt water and looks like a flower.'

'Well, that's not a bad beginning. Listen. An anemone is an animal. Its body is shaped like a tube or a very small barrel. This tube is hollow. The bottom part of it is generally attached to something on the ocean floor, and the upper part of the tube is fringed with petal-like things called tentacles. Anemones may be as small as a grain of wheat, or they may be as big as your arm, but the idea is always the same: the tentacles wave to and fro in the water, seize small bits of life and push them down into the hollow tube, which is a kind of primitive stomach. Is that clear?'

'Yes, I understand that perfectly.'

'Good. Now for the coral. In its simplest form a coral resembles an anemone. The coral is a little animal, with a cuplike depression in the center, and a fringe of tentacles at the top. The tentacles are continually waving in the water, and this sets up a current toward the little creature's mouth, and out of this stream of water the animal gets its food. It's the same principle that a child uses when it keeps drawing a stick through the water, in order to make a toy boat come back to shore.'

'But I thought a coral was made out of stone,' objected the boy.

The scientist nodded. 'I'm coming to that. What I want you to remember, though, is that the anemone and the coral are essentially the same.... Now for the differences. You've already hit on one when you mentioned stone, because the body of an anemone is soft, while the coral's body is hard — at least after the animal grows up.'

'But not when it's young?'

'No, it's soft then, just like an anemone,' said Mason. 'Have you any idea as to how corals come into existence?'

'I'm afraid I haven't,' was the embarrassed answer. 'I used to read a lot of natural history when I was small, but I guess I've forgotten it.'

'That's all right. At that time you had no particular reason for remembering it; but now that you're actually going to see corals growing, and perhaps help me collect different specimens, you do have a reason. So I'd better explain how it is.'

'Thank you. I wish you would.'

'Corals reproduce in more than one way,' said Mason slowly, 'but all that you need to know is that the young animals drop off from the parent and go floating off into the water in the form of tiny soft blobs of jelly. They go swimming and ——'

'How do they swim? With fins?'

'Oh, no, nothing like that. You don't have to have fins in order to swim.... But to come back to our newly born corals. Each one of them has a number of fine hairlike processes called cilia, and they swim by means of lashing out with these. It's something like paddling. Well, they swim about for a while, and finally they sink down to the bottom and attach themselves to something solid. As soon as this happens, our little jelly blob begins to change. Its center settles in and down, and the sides lengthen, until in time it has assumed a tubular shape, with waving tentacles rimming the top.'

'I don't see how they stick to the bottom, though,' said Ted. 'I should think they'd have to have — well, I should think they'd have to have glue! Or something like glue, anyway.'

The scientist burst into laughter. 'That's just what they have.'

'Whew! Where do they get that?'

'They manufacture it on the spot. Each little coral has the power to assimilate lime from the water, and this lime it uses to make a sticky secretion which enables it to cling to the bottom.'

'Still I don't see any difference between that and the anemone. The anemone sticks to the bottom, too.'

'Wait a minute, and you will see a difference,' said the scientist quickly. 'The coral not only secretes enough glue to fasten itself to the bottom, but it also builds itself an outer body wall out of the same material. This secretion contains lime salts, and these salts form the stony "skeleton" or substance which is popularly known as coral.'

'Now I see!' exclaimed the boy eagerly. 'The anemone is always soft, but the coral develops a skeleton made out of limestone.'

'Um; that's one difference between them. And another difference is this: the anemone is always a solitary animal, physically separate from every other anemone, while the coral animal develops a physical connection with a great many others of its kind, with the result that they form a colony.'

'I don't see how corals could do that,' said Ted, very much puzzled.

'They do it by what is called budding. One little coral animal simply grows out of the side of another, and another out of that, and so on and so on. Each newcomer secretes his lime, and in this way adds to the bulk of the colony. An ordinary piece of coral represents more than one animal; it represents a rather populous colony of animals, each with its own cuplike stomach and its own tentacles, and each cemented to its neighbors by means of the secretion it has made.'

'Do they call them polyps?' asked the boy, struggling to remember something he had read in a book.

Mason hesitated. 'I don't know whom you mean by "they,"' he said at last, 'but there are such things as polyps. The trouble is that the name is used very loosely, so we'd better not go into it too far. Suppose we say that each tiny cuplike animal in a coral colony may be called a polyp, and let it go at that.... All right, I wonder if you've got all this straight?'

'Let me see if I can sum it up,' said Ted eagerly. 'Both the anemone and the individual coral animal are a kind of cup or tube, with a fringe of tentacles at the top. But the anemone's body is soft, while the coral's body develops a limestone wall. Another difference is that each anemone is separate from every other anemone, but corals can keep budding until they build a regular colony of little animals. Each one of those little coral animals may be called a polyp, and when there are enough polyps in a colony they make a big coral tree.'

'Correct,' said Mason, with an approving smile, 'except that the colony of coral polyps doesn't necessarily take the form of a tree. It all depends upon what variety of coral you mean.'

The boy gave a low whistle.

'What's wrong?' asked the scientist.

'Nothing; only I never stopped to think that there might be different kinds of corals.'

Mason shook his head reprovingly. 'Ted,' said he, 'you don't seem to realize that Old Dame Nature hates monotony, especially in the sea. There are all kinds of sharks, there are all kinds of anemones, and there are all kinds of corals. So please look for variety when you're talking about life in the sea!'

This little speech was delivered with a gay smile, nevertheless the boy felt that it was intended as censure. Whereupon he bit his lip and looked out over the water, wishing heartily that he knew more about the sea.

'Of course there are different kinds of corals,' continued Mason, gazing idly toward the prow of the vessel, where the Professor was walking to and fro. 'Some of them are dome-shaped masses called brain corals; others resemble fans; some look like huge elk horns; and still others grow in the form of trees.'

Here the Professor shouted at them, and Mason hurried forward to see what he wanted, leaving the boy to peer over the rail into the sea and off toward the Florida shore. The vessel was still pushing to the south, but later in the day he noticed that Captain Nordstrom was bearing slightly to the west. Later on this westward tendency became more pronounced, until finally Ted could not help seeing that the Anemone was pointing due west. He gazed ahead, and saw nothing but water.

'Where'd Florida go to?' he asked Mason.

'We're south of Florida,' was the answer. 'Look! See that dark streak on the horizon? That's probably an oil steamer, going to Mexico.'

But Ted could not get interested in the tanker. 'Did you say we're south of Florida?' he said presently.

'Yes. We're passing between Cuba on the south, and Florida on the north, heading west. You'll begin to see coral reefs presently.'

The boy did not answer. He hated always to be asking questions.

'By the way,' said Mason, after a while, 'you know what a coral reef is, don't you?'

'No, I don't, unless it's a place where corals live.'

'And what's a reef?'

'A low island, I should think.'

'Sometimes, but not always. A reef is a rocky elevation which is within half a dozen fathoms of the surface of the water at low tide. Now what's a fathom?'

'Six feet,' said Ted promptly, pleased that he knew *something*.

'Good. Then a reef is an elevated mass of rock which is either close to the surface, or slightly above it. A coral reef is a reef that coral polyps have helped to build, simply by the process of long-continued budding.'

'I don't suppose there are any coral reefs up around Baltimore?'

'No. You can find certain types of corals as far north as Greenland, but the reef-building corals are confined to the tropical seas, where the water is never colder than about 68 degrees Fahrenheit. The Indian Ocean, the Australian coast, and this West-Indian-Bermuda-Bahama-Florida area are the best places to find coral reefs. But even in this tropical belt you won't find them everywhere.'

'Why not?'

'Because in addition to fairly warm water a number of other favorable conditions must be present. In order for a coral reef to develop, the water must be pure and free from sediment; it must be close enough to the surface to be highly aërated; and it must contain an abundance of small living creatures which are suitable for the coral polyps to feed on.'

'I see.'

'Professor Bradley has several reasons for coming down here to these particular reefs,' Mason went on. 'One reason is, of course, that the corals are in relatively shallow water. Another reason is that the water is very clear, and easy to see through. Then again the water in this area is generally very quiet, and naturally that makes it easier for us to study a submarine scene.'

'And a coral reef is built up by the polyps, did you say?'

'Partly by the polyps, yes.'

'Partly! Why not altogether?'

'Well,' laughed the scientist, 'that's a hard question to answer. You see, Ted, the development of a coral reef involves a great many factors. Besides the work of the coral polyps, you've got to take into consideration such things as wave action, the extent to which the sea bottom has sunk or risen, and so on. It's a complicated subject, if you're really out to explain all the whys and wherefores of a coral reef.'

'But,' said the boy thoughtfully, 'if scientists could only find out how fast the coral polyps grow, then I should think ——'

'Oh, we know something on that score, naturally. In this area, for example, young corals may grow about twelve inches in every fifty years. On the other hand, that doesn't mean that they rise that distance, because they may be broken off by storms.'

'Does that happen very often?'

'Yes; in fact storms are an important influence in the growth of a coral reef. The waves are continually slapping at the polyp colony, bruising it and breaking it off, and all that sort of thing, until there's a mass of débris at the foot of the coral. All the time, of course, more polyps are growing and growing, and trying their best to survive.'

'Do they ever grow above the surface?'

'Generally not. At low tide you can sometimes walk about a coral reef, but the polyps won't thrive unless they're under the surface. That's why you can always be sure that a so-called coral island has been elevated above the surface by something besides the growing-power of the polyps.'

'What would that something be, an earthquake?'

'Possibly. Some sort of subterranean upheaval, perhaps. But if a reef is pretty close to the surface, the waves will pile up rubbish against it, and in time there may be a rather solid deposit of coral fragments, seaweed, and even soil. Then various seeds drift along, get tangled in this mass, and start to sprout. In that way all sorts of plants, even trees, may begin to grow on an island which was originally a coral reef under the sea.'

The boy's eyes were sparkling. 'I say, isn't that interesting! I wish I could see one of those islands.'

'Well, you have already,' laughed the scientist.

'Where?'

'Great Bahama. Why, certainly! Both the Bahamas and the Bermudas were originally coral reefs under the sea. Every grain of sand on their shores came from the skeleton of a coral polyp, or else from some animal or plant that lived among the coral reefs in that neighborhood.'

Without a word Ted whirled about and began to stare back in the direction that he supposed the Bahamas to lie, his mouth falling open in amazement.

'Oh, you don't have to go back to the Bahamas to see a coral island,' Mason chuckled. 'Look right off there to the north and you'll see one.'

Ted turned his gaze to the north, and just as the scientist had said there was a dark spot on the horizon, indicating an island.

'Go get the binoculars, if you like,' said Mason.

The boy took advantage of this offer, and presently he was standing up against the starboard rail, studying the island through his friend's powerful glasses.

'See it?' asked the scientist.

'Yes. But it's not very big.'

'They vary in size. None of them are very large, though.'

'I see some funny-looking trees,' Ted announced.

'What kind of tree is a funny-looking tree?' asked Mason dryly.

'Well, I don't know, but it's green on top, and down by the roots it swells out into a lot of white, twisty things, like snakes.'

'That's a mangrove tree. Look it up in the encyclopedia some time. Those snaky things are the roots that are above ground. Mangroves are very common down in these parts. What else do you see?'

'Nothing,' said the boy, and lowered the glasses.

Mason nodded his head and smiled. 'That's just it. To any one but a scientist an island like that is a bit of soil, a few trees, and nothing more.'

'But what else could it be,' demanded Ted, 'even to a scientist?'

'Well, in the first place that island off there is one of the Florida keys,' was the answer. 'I might explain that the keys are simply a string of coral elevations, some of them above the surface of the water, and some of them under the surface. They string out from the southern tip of Florida in a kind of arc, in a general southwest direction.'

'Then we're going along the southern side of that string of keys?'

'Exactly.'

'I suppose Key West is one of those coral islands?'

'Yes. Key West is off on our starboard bow, right now.'

'Shall we stop there?'

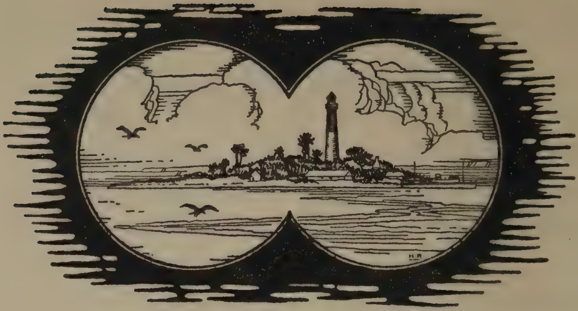
'No. We're going farther than that.'

'We are!' exclaimed the boy. 'I didn't think there was any land beyond Key West, not until you get clear across the Gulf of Mexico, anyhow. Seems to me the railroad stops there.'

'Railroad!' cried Mason. 'We're not on a railroad. We're on a vessel, so if the engines hold out we can go as far as we like. But we shan't get far into the Gulf of Mexico, at that. When we reach a point about sixty-five or seventy miles west of Key West, we'll stop.'

'Then where'll we be?'

'We'll be at Tortugas. Remember that name, Ted, because that'll be our address for the rest of the summer, even though we shan't be there except for a little while now and then. The Tortugas Islands, at the end of the Florida Keys, remember.'



CHAPTER VI

GETTING READY TO CALL ON NEPTUNE

Tortugas turned out to be a cluster of small isles, low, flat, and fairly well covered with vegetation.

Ted sighted them about two o'clock in the afternoon, and after that he fairly bristled with questions.

'How many people live on those islands?' he wanted to know.

'Very few,' was Mason's answer. 'As a matter of fact I think the only permanent year-round residents are the three men who tend the lighthouse.'

The boy lifted the binoculars again. 'Yes, I see a lighthouse. It's kind of on the end of one island, and it's white at the bottom and black at the top. Just think, the people that take care of that light are the only ones that live here!'

'The only ones that live here permanently,' Mason corrected him. 'There are a few temporary residents, of course. For instance, the whole Tortugas group is a bird reservation, and on one of the islands — Bird

Key — there's a man that the Government keeps here during the summer to protect the terns and other birds during their breeding season.'

Ted was looking through the glasses again.

'I see some buildings,' he announced. 'Maybe that's where that man lives.'

Mason squinted across the calm water. 'No, you've got the wrong island. I think you're looking at Loggerhead Key.'

'Well, there are some buildings on it, anyway.'

'I hope so,' smiled the other, 'because that's our destination. Or rather it's Professor Bradley's. He'll go ashore alone, probably. I think he must be down below now, sorting out the things he wants to take along.'

'What are those buildings we see?' asked the boy. 'Oh, there's a pier, too.'

'Yes, that's where you go ashore, when you go. Well, the small building on the beach is a boathouse, and the large white building back from the water, sort of in that grove of cocoanut palms, is the Marine Laboratory of the Institute. In the summer a group of marine biologists and other specialists come down here to study various phases of ocean life.'

'Oh, I see. And Professor Bradley wants to talk to the people there.'

'That's it. He's going ashore to consult the Director, chiefly about a good place for us to start work.... Here comes the Professor now. Probably he heard the Captain slacken speed.'

'That laboratory building,' observed the boy, 'looks like a big hat on a little man, the island's so small.'

'Um. The land surface of the Tortugas isn't much, I'll admit, but then the area above water isn't what we're interested in. It's the extensive submarine area around here that's so wonderful.... Wait till you make your début as a diver, and you'll see.'

By now the Anemone was barely drifting. The Captain ordered Joe to throw out the anchor, after which he got ready to take the Professor ashore in the motor-boat.

'I shan't be long,' said Professor Bradley, climbing down the ladder with a small satchel in his hand.

'Take your time, sir,' Mason answered.

The motor-boat began to pop, and a moment later it was trailing across the water toward the pier. Mason and Ted Farnum watched the Professor get ashore and set off in the direction of the Laboratory.

'Where does the name Tortugas come from?' asked the boy, gazing dreamily at the beach of the little island.

'Aha, there's a story to that! Do you know any Spanish?'

'Yes,' laughed the boy; 'I know *mañana* and *quien sabe*!'

'Well, *tortuga* is Spanish for tortoise. Ponce de León discovered these islands, along in June, 1513, and the first night that he spent here his men went tortoise hunting and caught a hundred and seventy of them.

So Ponce up and called the group Tortugas — out of gratitude, I suppose.'

'Ponce de León. The fellow that was looking for the Fountain of Youth?'

'Yes.'

'Why, then this is an historic place!'

'Hawkins was here, too, one time. You know the man I mean — John Hawkins, one of Queen Elizabeth's captains. He came along here about 1565, I think, looking for a stray treasure ship belonging to Spain.'

'I ——'

'Here comes the Professor,' Mason interrupted, 'and by the way he's walking he's got his information. We'll be out of here in no time at all, or I miss my guess.'

He was right; for no sooner was Professor Bradley back on board than he announced that they would be on their way immediately. Up came the anchor. The engines started, and off they slipped, heading east and afterward north. Finally the Professor held a consultation, and decided to anchor, so that they could reconnoiter in a smaller boat.

To Ted's surprise this smaller boat turned out to be, not the thirty-foot motor-boat which they were towing, but a shorter flat-bottomed affair that Joe and the Captain hoisted out of the hold of the vessel. This boat was different from anything the boy had ever seen before, for the reason that its bottom was fitted with a large sheet of heavy glass.

'Easy, easy,' cautioned the Professor, as the men lowered the boat into the water. 'Take your time. That glass mustn't be jarred.... Good, that's fine.... Mason, do you want to come?'

'I will if you need me,' said the younger man.

Professor Bradley hurriedly shook his head and climbed down the ladder, followed by Nordstrom, the Captain going along to row. Ted peered down at them with longing in his eyes, wishing that *he* had been asked to go.

'That boat's to look down into the water with, isn't it?' he said.

'Yes,' said Mason, as the Captain pushed off and started to row.

'Better get the steel chamber out of the hold after a while!' called the Professor.

'All right, sir,' replied Mason. Then he called to the colored man, 'Get the hatch off, Joe, and move things away from that steel chamber. Right away, and let me know when you're ready.'

Ted was still watching the men in the glass-bottomed boat. Captain Nordstrom was rowing, while the Professor squatted forward to peer down through the glass and into the clear water.

'I wonder if he can see bottom,' he said presently.

'That depends on how deep the water is,' Mason answered. 'In shallow water you can.'

'It's a great idea, all right.'

'What is?'

'That glass-bottomed boat.'

'Bosh,' scoffed the scientist. 'That thing's as out-of-date as a horse and buggy!'

'Then why ——' began Ted, and stopped.

Mason smiled at him. 'You mean why is the Professor bothering with it, if it's out-of-date?'

'Well, yes, I did mean something like that,' the boy admitted.

'I tell you,' said his companion. 'Years ago boats like that were an important means of studying coral reefs, but now they've been supplanted by diving outfits, and observation chambers, and that sort of thing. When I said the glass-bottomed boat was out-of-date, I meant that it's no longer our chief reliance, or even an important instrument in submarine study. About the only thing it's good for is what the Professor's using it for at this minute — to pick out a good site on the reef.'

'What would be a good site?'

'Oh, that depends on what's wanted. But what we're after this summer is a variegated coral reef in shallow water, with an abundance of tropical fish and other marine animals.'

A shout made them look up. The Professor was standing up in the boat, waving violently.

Mason waved back, then he started for the anchor, beckoning Ted to help him haul it up.

'They've found a place,' he explained, 'and the Professor wants us to bring the vessel into position.'

'It didn't take him long to find what he wanted,' observed the boy.

'No, that was pretty quick work. We'll be plastered with work now.'

Up came the anchor, and in another five minutes the Anemone was on her way to the neighborhood of the glass-bottomed boat, Mason at the wheel. They came up and slackened speed, waiting for instructions.

'Right here!' shouted the Professor, pointing to the water.

The man at the wheel began to maneuver the schooner into place, it being the Professor's intention to bring the stern of the Anemone directly over the spot he had pointed out. 'Then we'll put his observation chamber over the rail, so as to land it as near where he wants to work as possible.'

'Don't you use it, too?' asked Ted.

'Hardly ever. I prefer a diving suit. The Professor used to go down in a suit, but he feels that he's getting too old for that, so he tends to stick to his steel chamber. There! I guess that'll do. Now we'll throw out the anchor.'

The Professor was calling again. 'Hold her right there, Mason. That's fine. I'm going to look around to see if everything's clear.'

Nordstrom began to row again.

'What's he mean by seeing if everything's clear?' said Ted. 'Are we in a steamboat lane, or something like that?'

'Oh, no. He just wants to make sure that there aren't any sharks prowling around.'

'Whew!'

'It's just a precaution,' Mason went on. 'Probably we shan't be bothered at all.'

At this point Joe shouted up from the hold that he had the steel chamber clear. 'An' she am ready to go up, an' nen go down!' he added.

'I wish it could be done as easily as he says it,' said Mason, starting for the hatch.

Ted understood that remark before the next hour was up, for the steel chamber weighed two and a half tons, and the problem of handling it was a difficult one. They began by spreading a strong chain net on the floor of the hold, then with crowbars and planks they carefully pried the chamber into the center of this net, after which the ends of the chains were gathered up and hooked together, and a strong cable attached.

'So far so good,' observed Mason, and climbed up on deck again, to adjust their block and tackle and start the gasoline engine.

With these preparations they set about getting the big steel ball out of the hold. The cable was attached to the engine. The line grew taut. Slowly the chamber rose, higher and higher, up through the hatchway, and above the deck. Here it was held until a stout wooden truck could be wheeled under it; then it was blocked beyond all danger of rolling off, and wheeled to the stern of the schooner. Finally the gasoline engine was hauled aft, ready to aid in the even more difficult task of lowering the chamber into the sea.

By this time the Professor had returned. He was pleased with the progress they had made with the big ball, and yet it was apparent that he wanted to hurry matters to their conclusion.

'Let's take a sounding,' said he, and briskly rubbed his hands together.

Silently the Captain attached a lead sound to a stout cord and let it over the side, paying out until it struck bottom. Then he hauled it up.

'Seven fathom,' he announced.

'Forty-two feet,' said Ted to himself, for he was not yet used to thinking in terms of fathoms.

'A depth of seven fathoms is excellent,' declared the Professor. 'Now, boys, let's have the glass plate.'

The glass plate came up out of the hold in a large flat crate, consisting, for the most part, of wood shavings, so arranged as to give the maximum amount of protection to the glass.

Meantime Ted was studying the great steel chamber, and wondering what it was going to look like at the bottom of the sea. In shape it resembled a small globular electric-light bulb, and just as a light bulb has a hole at the top so this huge steel chamber had a hole at the top, a hole measuring two and a half feet in diameter.

At first the boy thought that the glass plate was intended to fit over this opening, but now he saw that this could not be. The glass was wider than the hole in the top of the chamber, and, moreover, there was another hole in the side of the steel ball, and this second hole was exactly the size of the glass plate. It dawned upon Ted that Professor Bradley intended to enter the chamber through the opening in the top, and then pursue his observations through the glass window in the side. The glass was fully two inches thick, and apparently strong enough to resist the ordinary jars of undersea work.

'Mason,' said the Professor presently, 'it'll take me some time to get this window fitted to my satisfaction, so you and young Farnum might as well get our deck equipment into shape. I'll keep Joe and the Captain here to help me.'

'Just as you say, sir,' answered Mason, and went off with the boy.

Together they straightened out the numerous bits of equipment which were to be kept on deck during the Anemone's stay in these waters. During the trip south they had slept below, but from now on they would occupy cots on deck, under the shelter of a wall tent. A second tent was to serve as a laboratory, a third as an office, and a smaller fourth tent as a dining-room. This last tent was eight by eight, the other three being fourteen by fourteen. In addition the laboratory and the office were connected by a canvas-covered passageway running between the two doors.

It was an odd sight to see four tents pitched along the deck of a schooner, but still more strange were some of the things which they unpacked and placed in order in the laboratory and office. There were microscopes, dissecting lenses, forceps and skinning tools, cyanide bottles, a half-dozen aquaria, and a miscellaneous collection of drugs and chemicals.

'What's this for?' asked Ted, putting down a can marked 'chloral hydrate.'

'That's an anæsthetic for marine animals. — Well, I think that's everything. Let's go see what they're doing with the chamber.'

The Professor and his two assistants were having trouble in getting the glass into place; indeed, it was growing dark when at last they got it properly adjusted. Finally, however, they finished with it, even to the iron band and the rubber strips which fitted around the edge, and kept out the water.

'I'm satisfied,' said the Professor grimly. 'We'll connect up the tubing in the morning.'

Joe took this as a hint to knock off and go get supper, and it was well that he did so, because it was nine o'clock before they were through eating. Almost immediately afterward they turned in, Joe sleeping forward, the Captain aft, and the Professor and Mason and Ted bunking in the deck tent.

Every one was up early the next morning, because it was clear that no one would have any rest until the Professor was at work in his precious chamber, under the sea.

And now Ted learned how the chamber was to be entered from the deck of the ship. A series of round collapsible cylinders were to be connected with the hole in the top of the great ball, enough being linked on to provide a steel shaft from the top of the water to the chamber at the lower end. The diameter of the cylinders was the same as that of the hole in the top of the chamber — namely, two and a half feet — and consequently there would be room for a man to pass up and down.

The collapsible cylinders were attached one at a time, the first clamping onto the edge of the hole in the great ball, the second clamping onto the upper edge of the first, and so on.

'Call me when you get to the bottom,' said the Professor presently. 'I'm going to rest awhile. My back's tired.'

Ted was helping where he could, and always he was using his eyes to good advantage. He watched Mason superintend the attachment of a third section of steel tubing, then a fourth, and finally a fifth.

'That's a clever scheme,' he observed. 'Did Professor Bradley invent it?'

'No; a sea captain by the name of Williamson figured this out, although the Professor and I have changed his scheme to fit our own particular requirements. Williamson used his apparatus in salvaging operations. One of his sons still uses a similar rig for taking moving pictures under the sea, they say. The Williamson method was to lower the chamber through the bottom of the boat, but we've found it easier to let it down over the stern.'

By this time the chamber was ready for the first stage of its submarine journey. Once more the gasoline engine came into action, this time for the purpose of hoisting the chamber over the rail and gently easing it down into the water. When the huge ball was under water and the tiny waves were lapping up toward the edge of the topmost section of the tubing on the upper side, Mason signaled for the Captain to hold it there until he could add a few more sections. Then the chamber was permitted to sink a bit farther, and still more sections were linked onto the top of the steel tube. It was like building a well.

'How far down could it go?' asked Ted, as he watched the chamber sink and sink.

'That depends. It might go down a couple of hundred feet, though of course you'd have to have more tubing and heavier steel, so as to resist the pressure.'

'I sort o' like the idea of that chamber,' murmured the boy thoughtfully. 'It sounds so comfortable and safe.'

'It's safe enough,' said Mason, waving for the Captain to lower away, 'but I wouldn't call it comfortable. All you can do in it is to sit and peek through the window, whereas if you're in a diving suit you can walk around and examine things at close range.... That's good, Captain! She's on the bottom. Ted, run and call the Professor. Tell him the chamber's down.'

CHAPTER VII

A GLIMPSE INTO AN ENCHANTED WORLD

The Professor did not come at once, and while they were waiting for him, Ted took advantage of the opportunity to peek over the edge of the steel tubing and down inside it.

'What do you think of it?' said Mason gayly.

'I don't know. I should think water would seep in between the sections of this tube.'

'Oh, no, there's not much danger of that. Those hinges on the inside of each section keep out most of the water; and besides, we fit a waterproof tarpaulin in and around the inside of the tube, just as an additional safeguard. I'll put that in after the Professor has inspected things.'

The boy sniffed at the air in the tube, and drew back onto the deck of the vessel, whereupon Mason began to laugh.

'I know what you're thinking,' he said, 'and for once I'm going to answer your question before you ask it! Yes, the air is bad down there, but we've got a small automatic air pump and a great long hose, made especially for this purpose, and when we start the pump and drop the hose down that tube, it substitutes good air for bad air, the used air simply escaping back up the tube, like smoke up a chimney. That keeps the air in the chamber fresh, no matter how long you stay down. Does that answer your question?'

It was Ted's turn to laugh. 'It answers *one* of 'em!'

'Whew,' said Mason, pretending to wilt, 'and what's the other one, or is there more than one?'

'No, just one, but it's an important one. How in the world is Professor Bradley going to get down to that chamber—*fall* down?'

'Well, he could do that,' chuckled the other; 'but you see it's forty-two feet down, and he's rather stiff, so I think he'll have to manage it some other way! He uses a narrow rope ladder with wooden steps, and, by the way, you might go down into the hold and get that ladder. You'll find it in that small rowboat that we haven't unpacked yet.'

Ted nodded and went off after the ladder, returning a quarter of an hour later to find the Professor inspecting the tube. Everything seemed to please him, and now the last preparations were made. The waterproof lining was fitted in place, the air pump was set to forcing fresh air down into the chamber, and lastly the rope ladder was unrolled and fastened to the edge of the tube.

'Now to inspect the chamber,' said the Professor, and, having taken off his coat and put on a thick sweater, he stepped over the rail of the Anemone and onto the first rung of the ladder, which had been dropped down inside the tube. Holding carefully to the sides of this contrivance of rope and wooden slats he slowly descended, lower and lower until his head was lost to view.

Ten minutes later he reappeared, and as soon as Mason and the boy saw his face they knew that he was not satisfied.

'The chamber doesn't face the right way,' he announced. 'The window doesn't let me see what I want to see. It wants to be shifted about thirty or thirty-five degrees to the south.'

This struck Ted Farnum as a simple request, yet as a matter of fact it took the combined man-power of the Anemone all the rest of the forenoon to execute it. The canvas lining and the air hose and the ladder had to be taken out of the tube, and the chamber itself slowly hoisted, each section of tubing being folded down like a bellows as it came up above the water. After that began a series of complicated maneuvers with engine, block and tackle, and numerous chains, all for the sake of persuading the heavy steel chamber to settle back upon the bottom at the desired angle. By this time Joe called them to dinner, and by the time they got the ladder and pump and lining back into the tube, it was one o'clock in the afternoon.

Once more the Professor slowly descended, Mason and Ted waiting at the top of the tube.

There was a long silence, ending in a sudden hollow and unnatural call from the bottom.

'It's al-l-l ri-i-i-ght!'

The boy gave a start. 'Wow! Doesn't that sound like old Neptune himself!'

'It sounds good to me,' declared Mason, 'because it means that he's satisfied, and now he can get to work. I'm certainly glad we don't have to shift that chamber again, for a while.'

Professor Bradley reappeared with a broad smile on his face. 'It's just right, the way it is. Yes, I think this set is going to be worth while.'

Then to Ted's surprise the scientist took his coat and walked off to the tent office amidships.

'What's wrong?' asked the boy. 'Why doesn't he go down again?'

Mason pointed to the sun. 'Too late in the day, or at least it would be before he got started. You don't need artificial light at that depth, but at the same time you can't do good work after about two in the afternoon. He'll start in the morning.'

'Early, I suppose.'

'No, not until perhaps nine-thirty. When you're down on the bottom the light isn't really first-rate until about ten. That'll give him half an hour to get things arranged.'

Yet as things turned out it was considerably later than ten o'clock the next morning when Professor Bradley was at last ready to descend; indeed, the brilliant tropical sun was high in the sky as he went down the rope ladder and into the steel chamber. After that, however, things moved at a faster pace. By means of a basket on the end of a rope they lowered various articles that he shouted for, and finally they sent down two high stools, a small folding table, and writing materials. Then he called for the moving-picture camera.

At Mason's directions the boy hurried off to the laboratory and came back with the camera, a modern contrivance which exposed its film automatically, once the button was pushed. Down went the camera, and up came the empty basket, after which they sat down to wait for further orders. Mason explained that after the Professor was fairly started he would not require much assistance, but for the time being he would need a good deal of it.

'Bas-s-sket!' It was the hollow voice of the man under the sea.

They lowered the basket. A pause, followed by a tug, then up came the moving-picture camera.

'That means that we're to take out the used film, and put in new,' said Mason. 'Come along and I'll show you how, because you'll have to do this alone, later on.'

Ted had his first lesson in reloading a submarine camera, and then they went back to the tube, to find the Professor halfway up the ladder.

'Want something?' Mason called down.

He peered up. 'Yes; I want a telephone connection in this apparatus before many days. But right now I want the still camera, and some extra plates. Send young Farnum down with them. The moving-picture camera, too. There's a group of very fine *Epinephelus* knocking about, and I want a number of pictures of them. Hurry.'

'All right, sir, we will,' said Mason, and sent the boy for the other camera and a box of plates, the Professor returning to the chamber.

'Here's the camera,' said Ted, coming back.

'Just take it down. And you'd better have a pencil handy, in case he wants to dictate notes to you.'

The boy's eyes popped open.

'Do you mean I'm to go down to the chamber?'

'Didn't you hear the Professor say so? Of course you're to go.'

With a gasp of surprise and joy Ted watched the scientist lower the camera and plates, and then he himself got into the tube and started down the ladder. Hand over hand he went down, his clothing rasping against the canvas lining of the tube, and his breath coming short, not from lack of air, but from excitement. Once he gazed up and saw Mason grinning down at him. He waved back and kept on descending.

It was cooler and cooler, and very still. The hole at the top of the tube grew smaller, and when Mason drew away there was only a light round disk to be seen — the sky. The steel tubing flexed slightly as it gave to the push and flow of the water outside, and though the boy was perfectly dry he knew that he was below the surface of the sea. By now he must be fully thirty or thirty-five feet down — yes, more than that, for all at once the rope ladder swung away from the narrow tubing.

An instant later his feet touched the bottom of the chamber. He let go the ladder and turned to look.

For the space of perhaps a minute Ted would have sworn that there was very little to see down here. The chamber was cluttered with stools and cameras and other items of equipment, and the light was dim. As for the window which looked upon the sea bottom, this was largely hidden by the Professor's bulk, so that it was only the edge of the watery world out there that the boy could see. Apparently Professor Bradley was busily watching something in the water; therefore the boy did not move, for fear of bothering him.

One minute succeeded another, and still the scientist did not turn. He was scribbling on a paper pad, and intently watching the scene beyond the window. Presently he broke the point of his pencil; silently he reached out his hand, in Ted's direction. The boy hastily gave him another, and the scribbling went on as before.

At last a sigh broke from the Professor. With a glance at his watch he drew away from the window, counting down his paper pad. 'Thirty-two species in less than fifteen minutes, all in one spot. Excellent, excellent. It throws light on the...'

But the boy never heard the rest of that sentence. In moving back the Professor had left the window clear, and now Ted could see straight through the glass and into the sea. It was somewhat like gazing into an aquarium, except that this 'aquarium' was the immense unfettered Atlantic Ocean!

His first sensation was of veiled, dreamlike glory, for at this depth the light was subdued, and so milky soft that it eased away all garish colors and harsh outlines. An impression of vague wonder came upon him, then gradually his eye and his brain adjusted themselves to the scene. He perceived that there were a great many colored fish out there, swimming lazily to and fro. And in addition to the fish there were strange objects of some sort, tinted and colored in marvelously beautiful shades. What were these 'objects'? Why, they must be flowers! They must be shrubs, some of them! Trees, too! He could make out what appeared to be a mass of heather, and beside it were flowers like phlox, and off beyond he saw what he took for strange varieties of chrysanthemums, lovely flowers growing under the sea. Then he saw larger things, including great branched treelike affairs, and others that resembled magnificent giant ferns, waving in the water like bushes in the wind.

'Well,' said the Professor, 'do you like it?'

Ted turned from the window with an effort. 'Like it! Why, it's wonderful! It's a magic garden!'

'Magic,' said the Professor, looking out the window. 'No, young man, magic suggests what is unreal and artificial, and what you see out there is very real and very natural. There's no magic out there, and there's not even a garden.'

The boy gazed into the sea, confused and somewhat awed.

'A garden means plants,' continued the Professor, 'and there's not a shred of plant life out there. Those large branching affairs that look like trees are corals. They're all animals.'

'Yes, I know they're animals, even though they look like plants, but...'

'But what?'

'Well,' said the boy, flushing, 'I don't want to make silly mistakes, but that little thing on the bottom — over there to the left — *it* looks like a flower.'

The scientist peered out. 'Flower, eh! With petals of gold and malachite, I suppose.... Look up the word "malachite" in the dictionary, when we go to dinner.... A flower.... Perhaps a monstrous orchid! No, that's not a flower, it's an animal, and if you were out there and tried to pick it you'd find those petals would vanish.'

Ted gazed into the sea without a word. The longer he looked the more he saw, and the more he thought about it the more astonishing it all seemed.

'Animals, animals,' murmured the Professor, reaching for the still camera, 'nothing but animals. We use the term "submarine garden" now and then, but it's a mere figure of speech. To be sure, there *are* submarine plants, but you don't see any out there.... Does it seem strange to you?'

'Yes, sir, it does. Especially to see all those colored fish swimming around. Oh, look at that pretty spotted one coming this way. Isn't he a beauty!'

The Professor straightened up. 'H'm; that's one of my *Epinephelus*. There's a group of them around here somewhere, and I'm waiting for them to come back, to take some pictures. I took one, but they were so far off I'm afraid it won't show them clearly.'

The spotted fish dodged and flirted about, but so far as they could see he was entirely alone in the watery world.

'I'll see if we can't get them to come back,' said the Professor, and so saying he picked up a hammer and rapped smartly on the wall of the chamber.

An instant later there was a noticeable increase in the number of fish before the observation window, and after a second rap the water was fairly thick with them: small fish, large fish, medium-sized fish, red, yellow, blue, and spotted fish, banded fish, striped fish, fish with blunt noses and fish with long snouty faces, but very few of the *Epinephelus*.

A third hammer blow brought a shout from the top of the tube. It was Mason, asking what was wrong.

'Tell him we're signaling for fish,' said the Professor.

Ted called this message back up the tube, then as he turned back toward the window he saw a startling change. The third blow had attracted still more fish, until there was a thick cloud swimming back and forth, curiously investigating the situation — suddenly they vanished, like a flock of small birds at the approach of a fox. Only in this case the fox was a huge gray shark, blunt of nose and cold of eye, and frightful to look upon.

'Goodness gracious!' exclaimed the boy, startled in spite of himself.

The shark swam quietly into view, turned and went off into the milky invisible distance, and suddenly returned.

'The rascal,' frowned the Professor; 'he's frightening every last fish out of the place.'

'Will he stay here?'

'He will for a while, at any rate. H'm, we might take a close-up moving picture of his eating methods, if... Yes, we'll try it. Yell up to Mason to lower a chunk of salt pork down in front of our window. Or, better still, go up and tell him what I want, and then bring down another roll of film for the camera. We'll just turn this villain to good account.'

Up the ladder clambered the excited boy, to deliver the Professor's message and get the film. He returned to the observation chamber trembling with anxiety, lest the shark should go away and thus prevent them from taking a close-up record of his table manners.

He found the shark still in the neighborhood, and the Professor impatiently waiting for the film. Ted was learning to work fast when it was a question of helping the scientist.

'Now if they'll lower that bait,' began the Professor.

'Here it is, sir,' said Ted, and pointed to the meat as it came sinking down through the clear water. Lower and lower it went.

'That's too low,' declared the Professor. 'Tell them to haul it up about two feet.'

By the time that the camera had been placed on a stool before the window, the bait had been raised to the desired level, and then came the great shark, drifting here and there, and finally up to the meat. He was so close that they could see through his half-open jaws, into the terrible maw.

'Notice that his teeth lie flat when not in use,' said the Professor, watching the creature intently. 'Ah!'

He had pressed the button and the camera was methodically registering the shark in the act of snapping off a sample of the pork.

'Fine!' said the Professor, beaming with pleasure. 'I think our film may show how those teeth come up when he's ready to use them. The animal erects them at will, apparently.'

'He certainly can bite,' said Ted, never taking his eyes from the monster.

'A shark of that size and type,' observed the scientist, 'could nip off your leg as easily as you'd bite a piece out of an apple.... He's coming back. Notice how he rolls over on his side?'

'Yes; what's that for?'

'To get a good look at the meat. It used to be thought that a shark had to lie on his side in order to bite, but that's not true. The point is that his eyes are set far apart, so that he sees better when he's on his side. H'm, see that? He took that bite without rolling over.'

The film was almost gone. The Professor rapped on the chamber wall, and in the flash of an eye the gray brute was nosing against the glass, registering his evil ugliness on the end of the camera's sensitive roll. Then the instrument clicked, and stopped.

'Tell Mason to drag the meat forward,' said the Professor, 'and then drop it. I want to be rid of this fellow.'

The boy shouted the order up the tube, after which he helped the Professor reload the camera.

'Shall I take the used roll up on deck?' Ted asked.

'No; don't bother with that now. See if you can adjust those little pieces of rubber under the legs of our stool, so that the top will be perfectly level. It's got out of position, somehow.'

The stool was readjusted, and then the camera was placed on top of it, the lens facing the window and the water beyond. No more of the shark was to be seen; nevertheless, the little fishes had not returned. Apparently they were waiting to make sure that the monster had really gone. There was scarcely a fish to be seen.... The submarine garden was deserted.... Far out into the silent, mysterious depths stood the corals, blooming in many hues and shapes, and some of them were waving their delicate tentacles gently to and fro, beckoning and beckoning....

'Dinnah! Dinnah am ready in da eatin' tent!'

It was Joe, calling to them from the deck of the vessel.

CHAPTER VIII

MYSTERIES OF COLOR AND TINT AND HUE

THAT call to dinner startled Ted Farnum out of a dream. His hour and a half in the submarine chamber had introduced him to another world. This new world had appeared unreal at first, yet it had ended by seeming very true and natural, and even tangible, so that Joe's shout fairly jarred on him.

The boy would have preferred to stay down, but Professor Bradley was already climbing up the tube, and of course Ted must follow him, as soon as he had sent up the cameras.

'Well, how did you like it?' smiled Mason, when the boy was back on the deck of the Anemone.

'Why, I — I ——' began Ted, and broke off to shake his head. He could not speak. What he had seen appeared strange enough from the observation chamber, and now that he had a view of the sky and the vessel to compare with his submarine impressions, they seemed all the more bizarre. Climbing up that forty feet of rope ladder had been like changing from one planet to another, with the result that everything was confused and *nothing* seemed real.

'Eb'ryting am ready!' the black cook was shouting. 'Mistah Mason, is yo' goin' eat, or isn't yo'?'

'Coming, Joe,' called the scientist, and told Ted to hurry.

They washed up and went into the little dining-tent, where the Professor was already busy with his soup. He was pleased with the morning's work, and as soon as they had taken their places he began to describe it. The boy listened closely, but unfortunately for him the conversation developed a technical turn, so that, beyond the fact that the term *Epinephelus* covered a variety of fishes called 'hinds,' he learned nothing at all.

'Are you going back this afternoon, Professor?' asked Mason.

'No. I'll give that bothersome shark time to drift off somewhere else. He spoils everything.'

'He's probably gone by now.'

'Possibly, but I'll not go down until to-morrow. I want to get my notes in shape, and dictate a few letters. Young man, you'll have to help me for a while.'

'Yes, sir,' said Ted, but though he spoke promptly, he had been hoping for another glimpse of the world under the sea.

As soon as dinner was over, they got up, Mason to disappear into the hold of the schooner, and Ted and the Professor to get to work in the canvas-covered office. The boy put up a folding table, got out Mason's portable typewriter, and sat down to take dictation on the machine. This continued for more than an hour, the Professor pacing to and fro as he talked, coming to peer over the boy's shoulder, and sometimes embarrassing him by pointing out an error in his spelling.

'I'm awfully sorry,' Ted blurted out, upon one such occasion.

'Never mind, never mind,' said the Professor kindly. 'It's only an occasional scientific name that you don't get right, and of course that's natural. I'll try to remember to spell them after this.... Now, then, take a sheet of fresh white paper and we'll try a short letter. The Captain has got to go to Tortugas in the motorboat to-morrow, and he can take it.'

Twenty minutes more and the dictation came to an end. Yet the Professor did not dismiss him. He merely strolled up and down, humming and sometimes talking to himself, while Ted sat at the typewriter wondering what he should do.

'Ratta ta, ratta ta,' sang the Professor softly, 'ra ta, ra tatta, ta-a-a-a-a...'

He went to the bookcase and picked up a huge volume, which he proceeded to open. With nervous fingers he began to page through it, and as Ted looked on he could see that the book was filled with color samples, of every tint and shade and hue.

The Professor sat down, completely absorbed in his book, and it was not until he had been reading for half an hour that the boy dared to clear his throat, and speak.

'Can I help you, Professor Bradley?'

The scientist jerked up with a startled face. 'Bless me!' he cried, 'are you still here?'

'Yes, sir.'

'Well, run along. I shan't need you any more. Go find Mason. Perhaps he has something for you to do.'

'Thank you, sir, I will,' said Ted, and went out, feeling very much like a small boy that has been kept after school and forgotten by the absent-minded teacher.

He found Mason on the shady side of the vessel, seated on the deck, and surrounded by a clutter of bolts and valves and iron pins.

'This is our other diving pump,' he explained, 'for helmet diving. I'm overhauling it a bit. I may go down to-morrow.'

Ted sat down beside him, and began to watch the young scientist as he went about the important task of testing the various details of the diving pump.

'What's the Professor doing?' asked Mason presently.

'Looking at some color plates. I asked him if I could help him, and he said no.'

'Well, he said the right thing, Ted. You couldn't help him with *that*. Nor any one else, I'm afraid.'

'What do you mean?'

'I mean he's up against a very difficult problem — the question of color in fishes and other marine animals. It's one of his hobbies; in fact it's getting to be his chief concern.'

Ted looked at his companion with a puzzled face. 'Color, did you say? Is that such a hard problem?'

'Rather,' chuckled Mason. 'Why, men have spent years and years on that conundrum, and without being much the wiser, at that. Huge books have been written about it, too. And still it's not solved.'

'There's certainly enough color down there,' observed Ted thoughtfully. 'I never dreamed of anything so gorgeous as some of the fish we saw this morning. They were so bright.'

'*All* of them?' smiled the scientist.

Ted took time to reflect. 'No, not all of them. I guess I stretched it a little.'

'Yes, you did. Not all marine creatures are brightly colored, though of course a great many of them are, so that until you get used to submarine scenery your general impression is likely to be that every living thing is painted up like a wild Indian.'

'That's about the way it seemed to me,' nodded the boy. 'I saw fish down there that were every color of the rainbow!'

'And more, too,' added his companion. 'Probably you saw hundreds and thousands of tints.'

The boy looked up, but he did not answer. He suspected Mason of making fun of him.

'No, I'm serious,' the scientist continued. 'Nature paints in many thousands of shades, and only a few of them are known to us. Even our widest range of colors falls far short of the possibilities.'

'Do you think all those different colors have a purpose?'

'As a general proposition, yes. The thing to remember is that Old Dame Nature is much wiser than we human beings are. Very often we fail to see a reason back of what she does, but that doesn't prove there isn't a reason. The more you study natural effects, the more intelligence you'll see in them.'

Ted sighed. 'I should think it would be an endless job to figure out the meaning of thousands of different colors in the sea.'

'Oh, no one would try to explain every single tint,' protested Mason, leaning over to get an oil can. 'The chief thing is to hit upon the principles behind all this riot of color.' He puttered with one of the valves from the pump a moment, then as it responded to the oil he chuckled, 'And there certainly are a lot of contradictory principles, if we're to believe every one that has taken a fling at explaining it.'

The boy waited for him to go on, feeling very keenly that he himself had no information to contribute.

'There's the warning idea, for instance,' said Mason. 'Some people will tell you that one important reason for bright colors in fish is to warn their enemies that they're not good to eat.'

Ted did not ask him what he thought of that idea, for it was clear that Mason did not place any great value on it.

'Other people,' continued the scientist, 'favor the notion that color is the instrument of sexual attraction. For example, they'll tell you that the bright hues of certain fish serve to attract mates.'

'Do you believe that?'

'Well,' said Mason, with a short laugh, 'color is not my field, but I will say that I think Nature takes care of sex attraction in fishes by different methods than color.'

'I think some of those fish I saw this morning had bright yellow tails.'

'There are such fish.... Do you know how some students of coloration would explain that?'

'No.'

'They'd say that the bright tail is for the purpose of helping others of the species to follow. Sort of an idea of keeping your eye on the tail-light ahead, so as not to get separated from the crowd!'

Ted began to laugh, vastly amused at the thought of a string of fishes one behind the other, and each with its eyes glued on the flashing yellow tail of its comrade ahead.

'Then there's metabolism to consider,' said Mason.

'Metabolism?'

'Yes; don't you know what that is? I thought every high-school student knew that!' and the scientist gave him a teasing look. 'Well, metabolism refers to the chemical changes that are constantly going on in the cells of the body, due to the assimilation of food and related activities. It's a complicated process to explain, but that's the basic idea.'

'But what's that got to do with color?'

'It's hard to say. Yet some students of coloration have suggested that the two phenomena are related. For instance, there are fish that take on a peculiar color scheme when they're hungry — the barracuda is one.'

'Barracuda,' said the boy. 'I don't know him.'

Mason gave him a shrewd glance. 'And I hope you never will,' he murmured; 'down on sea bottom, at any rate. But, anyhow, the barracuda illustrates my point. Of course this whole problem is very complicated, and really no one but a specialist ought to pass his opinion on it; still, this idea of metabolic change is certainly fascinating. Take the dying dolphin, for example.'

He paused to fill the oil can from a large tank at his elbow, and presently continued, 'Ted, if you ever see a dolphin dying, you'll see one of the most beautiful sights on earth.'

'Is that so?'

'Um. The usual color of a dolphin is blue or emerald green above, with rather bright blue spots farther down, and the under parts light in color; but a dolphin that is fatally wounded and is dying changes color in the most marvelous fashion imaginable. It fairly shimmers with tinted beauty, and goes from one hue to another with such rapidity that you're powerless to name one shade before another follows it.... And the reason for it is absolutely unknown, so far as proof is concerned.'

'Isn't the dolphin a deep-water fish?'

'Yes; and speaking of deep-water fish, you've got another peculiar angle to this color problem. A great many deep-sea fish are dull and somber in color — black, dark brown, or subdued purple, for example. But others are decked out rather brightly. Some are red, even though they live in deep dark water where the red would certainly never appear red.'

'That's queer.'

'Oh, that can be explained. Red absorbs a relatively large amount of light, and perhaps Nature makes certain deep-sea fish red so that they can absorb the maximum amount of the sunlight which filters down into their environment.'

'But ——'

'The trouble is, however, that other deep-sea fish are not only not red, but they're brightly painted in other colors. There's one member of the *Chimæra* group that is brown, blue, and light violet, with bright yellow eyes, for apparently no reason at all!'

At this point in the conversation Ted suddenly slapped his leg.

'Bright idea?' smiled the scientist.

'I don't know,' said the boy hurriedly, 'but I've been thinking. Why couldn't the color of fishes be explained by saying that it helps them to hide away from their enemies?'

Mason encouraged him with a smile and a nod, and the boy went on:

'Now that I think of it, that's one good reason for the color of land animals, so why not for sea animals, too? In the winter time a rabbit turns white, so he won't be noticed against the snow, and in the summer he's a gray-brown, so that he can fit in with the color of the woods and fields, or wherever he is.'

'That's so.'

Ted rushed on, so enthusiastic over his 'discovery' that he did not notice the faint smile lurking at the corner of Mason's mouth.

'And I saw something like that this morning, down in the observation chamber,' he said. 'There was a fish that had brown markings when he was near a piece of brown coral, and when he swam out over the sand he turned a pale gray all over.'

'Hogfish, maybe,' was the scientist's comment. 'A great many fish change color like that, some of them instantaneously.'

'So as to fit in with changes in the environment!' concluded the boy triumphantly.

'Yes, apparently that's the reason.... By the way, Ted, how would you adjust your theory of protective coloration to the fact that many of the fish in the sea have bright bands running up and down their sides? Do those bands help them to fit in with their environment?'

The boy's face fell. Now that he thought of it, there were a great many fishes like that, some of them with as many as half a dozen gaudy stripes crossing the body, and certainly such vivid stripes did not help them to appear inconspicuous. On the contrary, it made the fish more noticeable than ever!

'Well, that knocks a hole in my theory,' he admitted, grinning sheepishly. 'I was sure I had the thing figured out until you mentioned that.'

The scientist pushed aside his bits of machinery and fell to wiping his hands on a piece of cotton waste.

'Wait a minute,' he said. 'Maybe you've still got your theory.'

'I don't see how,' protested the boy. 'I can see protective coloring in the case of a fish that changes its color to suit the background, but those gaudy stripes and bands! How could they possibly fit in with the idea!'

'That,' said Mason slowly, 'is precisely what most people don't see, and that is exactly what Professor Bradley is trying to make them see.'

Ted stared.

'Those bright bands may be protective after all,' the scientist went on calmly. 'A man by the name of Abbot Thayer developed the idea a number of years ago, and now Professor Bradley is carrying on his theory, particularly with regard to fishes. Thayer specialized in other types of animals.'

'But I don't see the point!'

'It's rather simple,' smiled Mason, 'once you understand it. The idea is this.... A fish is almost always recognized by his outline. Whenever he moves, he therefore prints his profile against some sort of background, or tends to, at any rate. Very well; the bands and stripes and spots and blotches that seem to trouble your theory are simply Nature's method of helping the fish to destroy his outline.'

'Oh!'

'Do you get it?'

'I — I think so.'

'It's perfectly logical. The enemies of a particular fish are perhaps looking around for him, and their chief reliance is their power to recognize his outline. All right; if that outline is broken by, say, several broad stripes running up and down his sides, then the enemies tend to see, not a fish, but a number of vertical segments of something. Apparently those segments are not related, and certainly no one of them looks like a fish, so the result is that the intended victim escapes destruction; or at least he is less conspicuous than he would be without his pattern of colors.'

But Ted had an objection. 'That's true,' said he, 'but just the same you can see the outline of those banded fish, pretty plainly, too.'

'*You* can,' was the retort, 'and *I* can, but that's no sign the fish's natural enemies do.'

'I don't get your argument.'

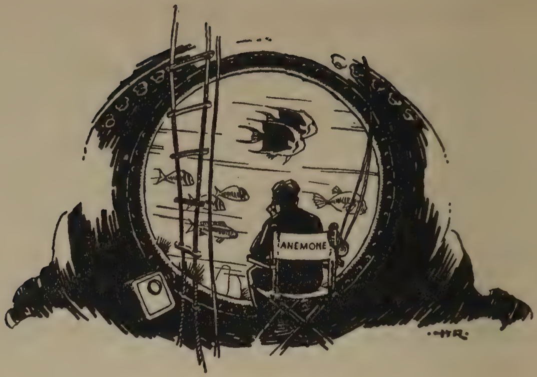
'I mean to say that fish are extremely near-sighted, and if they're to see an edible relative they've got to get up fairly close. And this near-sightedness fits in with the fact that a pattern of stripes and bands is much more effective at close range than it is at a considerable distance away. Looking at things from the point of view of a fish, it is probably much more difficult to distinguish such an outline than would appear to our superior eyes. All in all, the protective or obliterative theory of coloration is sound, as Professor Bradley is trying to show.'

'H'm; and that explains all this variety of colors.'

'Certainly not,' said Mason quickly. 'It's a good theory, and all that, but don't credit it with too much. That's one trouble with us humans, Ted, we're always and forever trying to find *one* explanation for a phenomenon, even though it's a complicated phenomenon. No; the theory we've been discussing is simply a theory, a good theory, but a theory, for all that. It explains a good deal, but so far we can't say that it explains all angles of the color puzzle. The mystery is still with us, waiting to be solved.'

'Do you think it'll ever be solved?'

'Who knows?' said the scientist, gathering his tools together. 'It's one of Nature's mysteries, and her mysteries are now and then pretty difficult puzzles for mere Man to unravel.'



CHAPTER IX

FORTY FEET DOWN AT TWILIGHT TIME

TED spent the next forenoon in the office, helping Professor Bradley. He brought him books and charts, he sorted papers, he took notes, and finally he sat down at the typewriter and wrote out, at the dictation of the busy scientist, a detailed synopsis of the previous day's work. It was astonishing how much careful work had grown out of a few hours of observation on the sea floor.

'I think that's all of that,' said the Professor at length. 'Now if you'll get the plates we exposed yesterday, we —— What's that noise? Do you hear something?'

'Maybe it's the diver's pump,' was the boy's answer. 'Shall I go see?'

'No. That's what it is. It's Mason, going down. Well, let's go into the laboratory and fix up some sort of a darkroom, so that we can develop our plates.'

The boy followed along cheerfully, although secretly he was bursting with the desire to go watch Mason. But it was not to be; therefore he swallowed his disappointment and helped set up a small closet of a darkroom, in one corner of the laboratory, after which the Professor and he disappeared inside and closed the door. Fortunately the door shut out most of the noise of the diver's pump, so that he was able to give his undivided attention to the task in hand. Under the Professor's direction he got the developing trays ready, he made various solutions, and then he stood by while the scientist skillfully washed the plates into the likeness of his coveted fishes and corals.

'On the whole they're good,' said Professor Bradley, some forty minutes later. 'Time for lunch, isn't it? We'll have a bite and go down into the chamber again. You can come with me. I'll need you.'

'Don't you want to develop the moving-picture films, sir?'

'No. You and Mason can take the boat and go over to the Marine Laboratory for that. They have the equipment, and we haven't.'

With this the Professor led the way to the dining-tent, where they found Mason waiting for them.

'Did you go down?' asked the boy, sliding into his seat.

'Um. Didn't stay long, though.'

'Oh, didn't you?'

'Pains in my ears,' said Mason casually. 'The air isn't coming just right. I'll work that pump over again this afternoon.'

Somehow this comforted the boy. He was not selfish, and he was not envious, but he had never seen a diver go down into the sea, and it was a satisfaction to know that he would not be missing the sight this afternoon while he was in the chamber with the Professor.

After lunch they scattered again, Mason to wrestle with his pump, his two companions to disappear down the steel tube. The Professor went first, the boy staying at the top until he had lowered everything they would need: cameras, pencils and paper, stools to sit on, a pair of binoculars, and minor articles. And once Ted was actually on his way down the rope ladder he forgot all about Mason and his diving, simply because the fascination of his submarine garden had seized upon him again. By the time he reached the chamber, he could think of nothing else but the wonderful things he was to see and the new acquaintances he would probably make.

This time, however, the Professor did a little differently from the day before. He took three or four preliminary photographs, then he seated himself at the observation window and motioned to the boy to bring the other stool and sit beside him.

'Take a pencil and that pad of paper,' he directed. 'I'm going to make some notes as to color. Jot down what I say.'

Ted hastily got ready to write, but to his surprise the next ten minutes did not bring a single word from the Professor. He merely sat there on his stool, adjusting his spectacles and peering through the thick glass of the window which faced the sea. Sometimes he nodded to himself, and sometimes his lips moved, yet he did not speak for fully ten minutes.

'Porkfish,' he said at last. '*Anisotremus virginicus.* Bright yellow with two bold black stripes vertically on fore part of body. Banded effect most pronounced in strong light, less so in shadow. Observe color changes under controlled lighting at night.'

The boy wrote all this down, and then there was another long pause. And so it went for fully two and a half hours; the scientist and his young helper sitting side by side, staring into the water, and now and then getting down an observation upon the delicate relations of color and movement on the floor of the tropical ocean. Their view was marvelously clear, the sunlight penetrating with such force as to throw the shadows of the fish on the white sand over which they passed in silent grace and beauty.

But Ted Farnum was not simply waiting for the Professor to dictate notes; he himself was busy in between times. He was using his eyes. The day before he had received a rather general impression of the submarine garden, but now he began to distinguish details. Little by little he was increasing his understanding of what it was all about. Instead of merely gazing, he was studying things, carefully observing what the slow-moving starfishes did, watching the tentacles of the sea anemones and corals, and even attempting to count the different colors on a particular fish.

'Gray snapper,' said the Professor all at once. 'Drifting in and out through a coral fan. His color matches it perfectly while he is passing through, but changes again when he is fairly away from it.'

This note went down in haste, for it sounded interesting and Ted wanted to see. Yes; there was a great fan-shaped coral out beyond the window, a thin lacelike growth about three feet across, with a jagged hole in the center. And while he sat looking at it, he saw a fish come drifting through this hole, and presently turn and go back again, rubbing against the coral as if on purpose.

'That's his scratching post,' smiled the Professor.

Ted did not know what to think of this. What! Could it be true that the gray snapper was actually going back and forth through that hole for the sake of scratching his sides! To the boy it seemed ridiculous ... and yet his scientific companion had vouched for the fact, and so there was nothing to do but believe him.

The Professor picked up the binoculars and held them to his eyes. Presently he handed them to the boy.

'Your eyes are younger than mine. Try to see if those small fish over by that plume have longitudinal stripes or not.'

The boy took the instrument. His naked eye had told him that far in the watery background of their animal garden there was something waving to and fro, and now the glasses showed him that this was a magnificent coral plume, tall and golden yellow, and so delicately made that the motion of the water sent it back and forth like an ostrich feather in the wind. It stood up high above its neighbors, and through its fringed edges a multitude of small fishes went drifting back and forth, as if they admired it too much to want to leave it.

'I can see fish,' said the boy finally, 'but I can't seem to make out the pattern.'

'Let it go, then,' was the Professor's patient answer. 'We've done enough for to-day. Wonderful tints on those fish.... If I could only have a record of them!'

'Couldn't you take colored moving pictures of them?' suggested Ted.

'Humph. Yes, that could be done, and people have done it, but the result is not wholly satisfactory, at least from a scientific point of view. So far photography has failed to solve the problem.'

The scientist rose from his stool and began to stretch his legs, sighing heavily. Ted remained where he was, ready with pencil and paper.

'We'll stop now,' said the Professor. 'It's getting dark.'

The boy was startled. 'Dark!' he exclaimed. 'Why, I...'

'Your eyes may be young,' scoffed the scientist good-naturedly, 'but they need sharpening, don't they! Yes, it's getting dark. Of course our watches tell us it's early, and up above the water the sun is still bright; nevertheless, it is growing dark, *down here.* I've been noticing it for better than half an hour. Look at the shadows those fish are casting. Not so sharp as they were a while ago, that's plain enough. Don't you think so?'

'Yes, sir,' said the boy, not knowing what else to say. The keenness of this man of sixty astonished him.

'Twilight comes early down here,' mused the Professor, and turned toward the rope ladder. 'Well, I'll go up first and let down the basket for our things. Be sure to send up those binoculars.'

Up the tube he went, and after him the equipment they had brought down, and then Ted. Back on deck he helped put away the cameras, after which Professor Bradley dismissed him, saying that he could do what he pleased until supper-time.

'Would you mind if I went back down to the observation chamber?' asked the boy, yielding to a sudden impulse.

The scientist looked at him sharply. 'What for?'

'Oh, just to watch things. It's awfully interesting, sir.'

'You think so, eh! Well, I don't mind; only be careful in going up and down the ladder, and don't hurt yourself.'

'Thank you, sir; I'll be careful.'

He turned to go, when the Professor called him back.

'By the way, young man, very often the brain sees more than the eye. Do a little thinking while you're down there, and you'll see more.'

'I'll try, sir,' said the boy, and left the laboratory, smiling happily.

He lost no time in getting back down the tube and into the great steel chamber. Once there he drew up a stool and pressed his face against the glass, to gaze and marvel at what he saw out there on the ocean floor. All afternoon he had been sitting in this very position, yet his submarine garden had not palled; indeed, it was more fascinating than ever before, because now he was alone with it. And besides, he had not been there so very long before he realized that a strange and mysterious change was creeping over the scene. Twilight had come upon it.

As he sat there watching, he was amazed to see the effects of this gradual dimming of the overhead light. Ted Farnum had never stopped to think of what went on in the sea at night; it had never occurred to him to think about it. Perhaps he had rather assumed that the dwellers of the depths went to sleep when the light failed! But if such had been his idea he was now discovering how mistaken it was. Twilight was not lulling the animal garden to slumber; it was actually arousing it to new and greater activity!

'Hey!' came a shout from the top of the tube.

He got up to answer. It was Mason, yelling down at him,

'What are you doing down there?'

'Nothing! Just looking at things. Do you need me?'

'No, I don't need you,' called the young scientist, and came rapidly down the ladder. 'So you've got the fever! Wonderful, isn't it?'

'I should say so, especially right now. Why, things look entirely different from what they did a couple of hours ago. Look at those red fish out there. They seem to be coming in from somewhere else. They weren't around here earlier in the afternoon.'

Mason sat down on a stool, peeping through the glass. 'Those particular fish,' he announced, 'are coming home from work.'

'Coming home from work!'

'Certainly. And if you'll watch closely, you'll see other species getting ready to go to work. They have two shifts down here, didn't you know that?'

'No,' said Ted, not knowing whether to believe him or not.

'I mean it,' said Mason. 'I suppose you've been thinking that these fish are loafers, haven't you?'

'That's just what I *have* been thinking,' grinned the boy. 'All they seemed to do was loll around, like a bunch of loafers in a park.'

The scientist was laughing. 'That's not a bad comparison,' said he, 'except that you're not being fair to our finny friends. As a matter of fact, Ted, some fish hunt by day and rest at night, while others loaf around or hide during the day and come out at night. Those red fish are day workers, and now they're coming home to rest. Let's see... yes, look at that timid little chap with the big eyes! That's a squirrel fish. He's probably been right here all day, and I'll wager you haven't seen him before.'

'That's right, I haven't.'

'Because he's a night hunter,' declared the scientist. 'If you watch closely you may see him start out after a while. That type of fish is said to be nocturnal. In the daytime they hide, or if they do stay in the open — like some of the species you've been watching this afternoon — they merely move with the sun and the tide, and keep away from possible enemies, of course. Then along in the evening they brace up and start out for the night's hunting.'

'Where do they go?'

'That's hard to say. We know where some species hunt, but there are others that have so far managed to outwit us. Some of them must go a long distance, though.'

'Yes, but I don't see how you can be sure of that if you don't know where they go.'

'Why, we know that much because we've caught such fishes in the morning, and we've found their stomachs full of types of food which don't exist within a considerable distance of their daytime haunts. Well, I must go. Stay here as long as you like, and if you don't want to come to supper, I'll have Joe save you a good thick sandwich.'

'Thank you, Mr. Mason,' said the boy heartily. 'I would like to stay while I have the chance.'

He watched the man vanish up the tube, then once more he turned to the scene which lay beyond the glass window. Now that his scientific friend had helped him with a word of explanation, he could see for himself that the fishes were adjusting themselves to the dimmer and dimmer light. Some of them were coming home, drifting in one by one, or by twos and threes and larger groups, moving slowly, like tired working people, and silently finding their way into the caves and holes of the coral reef, where they would be safe for the night.

And even while these day dwellers were retiring for the night, other fishes were beginning to stir and grow restless, like fashionable folk who make a practice of going out at about the hour that their neighbors are coming home. Mason's comment on the squirrel fish seemed to have sent the timid creature back into his hole, but presently he showed himself again, together with three others of his kind. They did not move off at once; instead, they clustered under a protecting branch of coral, nervously shifting back and forth, opening and shutting their mouths in the endless way that fishes have, and seeming to wait for the shadows to thicken. 'Is it time, is it time?' they appeared to ask, and the sun above their heads answered them by drawing its light farther and farther from their watery home. Whereupon the little fellows grew bolder. One of them made the experiment of swimming out from the coral a few feet, and presently his companions followed him. For a moment they hesitated, then, as if some one had shouted

'Go!' at them, they darted off together, to be gone all night, hunting in the dark and dangerous sea, all for the sake of a bit of food to keep them alive.

'Heavens!' cried Ted suddenly, for a startling event had taken place not five feet from his window. Something had risen up from under the sandy bottom, something that apparently had been hiding there all day, for the boy had seen nothing but sand in that spot all afternoon. It was a crab. He was coming out for the night, and when he had stretched his legs and got his bearings, he scuttled off at a rapid but stealthy pace, evidently bent on ambushing some unwary dweller of the deep.

Nor was this the end of the twilight pageant. In addition to crabs there were lobsters, these last creatures issuing from their caves with waving antennæ and hungry glances here and there; and then there were shrimps which swam off with a quick folding and unfolding of their tails. Even the corals were responding to the thickening light, for though these animals were rooted to one spot, yet they had their own methods of hunting by night. For instance, a certain coral branch had been within Ted's view all that afternoon, and now to his astonishment he saw how it could change in the evening. It was expanding like a flower which has been photographed by the 'slow' moving-picture process. He saw its branches blossom into a mass of white petal-like tentacles, each one of them pushing into the water and writhing and waving, seeking tiny bits of food as it came drifting by.

By this time the light was so dim that it was hard to see. Yet the boy made no move to go. He was having an amazing experience. Every moment seemed precious, and so he clung to his post like a person who fears he will never have another such opportunity. With his face close to the window, he stared into the gloom, forgetting supper, forgetting the Professor and Mason and the good ship Anemone, and everything else, except the magic of the scene which lay before his straining eyes.

Suddenly a cry broke from him. The view had been growing darker and darker, until he could no longer make out the outline of either fish or crab. All the watery world was sinking into shadow, until in some mysterious fashion he became aware of a light!

At first he told himself that he was mistaken. No doubt it was a last bit of reflection from the dying sun, far above the surface of the water. Or perhaps he was imagining it.... No! There *was* a light out there, in the water, and on the bottom of the sea! It was faint and seemingly far away; nevertheless, it was actually a light, and a colored light in the bargain. Then he saw other lights, tiny specks of bluish green, with a hint of red.

'Good gracious alive!' he exclaimed. 'I must be seeing things!'

The sound of his own voice broke upon his ears as something strange and unreal. He looked into the water again. Yes, there were lights out there, and now some of them appeared to be moving gently to and fro, like submarine lanterns. What were they? What could they possibly be? He must go find Mason and ask him to come and look.

Hastily he scrambled to the ladder and climbed to the surface. It was dark in the upper world, but fortunately he saw Mason pacing the forward deck. He ran to him, gasping, 'There're some lights in the water down below! Don't you want to come look at them? It's the queerest sight you ever saw!'

Mason gave him an odd smile and waved toward the open sea. 'Why climb down seven fathoms to see magic lanterns? Look out there.'

CHAPTER X

STRANGE LANTERNS IN THE DARKNESS

The boy simply stared. Out beyond the rail of the schooner he saw a vague expanse of dark sea, and now and then a broad flash of wondrously soft light, as if the waters were on fire. What was it! That light was not the reflection of the moon, for when he looked up into the heavens he saw only dark clouds and an occasional star — there was no moon to be seen. Nevertheless there was the broad blanket of mild fire, covering the water for miles and miles.

'You've never seen this sort of thing before?'

'No, never. I never knew there was such a thing. What is it, Mr. Mason?'

'Animals.'

'Animals?'

'Um.'

Again the boy stared out over the luminous sea. Animals! How could that be! There was no sign of even one animal, no outline of a body, no sound, and apparently no movement, nothing but a blanket of calm light, faint and soft.

'This reminds me of one of Crabbe's poems,' chuckled the scientist. 'It goes something like this:

'"And now your view upon the ocean turn,
And there the splendor of the waves discern."'

'Did he mean what we're seeing now?'

'Yes. The next two lines go something like this:

'"Cast but a stone, or strike them with an oar,
And you shall flames within the deep explore."'

'That rhymes,' observed the boy quickly, 'but I'd want something besides a stone or an oar to explore that with.'

'You're right,' was the emphatic response. 'It takes a microscope for this sort of thing.'

'Aha! Then your animals are little fellows?'

'In this particular case, yes.... Would you like to get a few of them? We just ladle 'em up, like soup. This may turn out to be a new species, although I think I know what it is. You get a bucket and I'll step into the office and tell the Professor where we're going.'

Ted threw the rest of his sandwich into the sea, and hurried off. Presently Mason joined him, and together they lowered a rowboat. Another minute and they were jerking their way over the water, heading toward the mass of fire.

'Looks spooky,' said Ted.

'Not when you know the explanation. Science may add to our sense of wonder, but never to our superstitions, remember that. The old-time Caribs that used to sneak along here in their war canoes were probably scared to death by this phenomenon, but you and I are somewhat more enlightened.'

Ted rowed on in silence. He could not help thinking that, however enlightened Mason might be, he himself was as ignorant of this strange fire as any savage could possibly be.

They were quite close to it by this time; indeed, a few more pulls at their oars and the boat was surrounded by a blanket of liquid fire, mysteriously glimmering under the dark sky.

'This is far enough,' said Mason, and stopped rowing.

Ted plunged his bare arm into the water, playing his fingers in it.

'Anyhow, it doesn't burn,' he said.

The scientist went on with his poetry:

> '"Or scoop the stream phosphoric as you stand,
> And the cold waves shall flash along your hand!"'

The boy brought up his hand; it was covered with soft blue light. 'Your poet's right,' he chuckled.

Mason picked up the bucket and lowered it into the water. Then he carefully drew it up, brought it over the side, and set it in the bottom of the boat. The water in it was glowing.

'Have you captured your animals?'

'Yes, and I'd hate to have to count all the tiny creatures that we've got in that bucket. Let's go back now.'

They set out for the schooner. The vessel appeared as a heavy mass against the sky, and save for her riding lights and a beam from the Professor's study table she was entirely dark. Joe and the Captain seemed to have gone to bed.

Five minutes of steady pulling brought them to the ladder. They took the bucket of watery fire into the laboratory. Mason got out a microscope and skillfully transferred a drop to the slide.

'It doesn't look like anything but water,' declared the boy, watching intently.

'Ah, that's where the microscope has something to say.... Now we're ready.'

He placed his eye to the top of the instrument, and rapidly brought it into focus. 'Just as I thought. It's *Noctiluca miliaris.*'

A moment later he told Ted to look.

The boy seated himself at the microscope and gazed down, only to be disappointed. For some reason he had expected a creature with legs and a head, and perhaps a pair of eyes, and here there was nothing but a number of roundish bits of jelly, each provided with a tiny whip-like process resembling a tail.

'Mighty small,' was his comment.

'Yes; and as you see them there each one is magnified thirty times. They swim with that little tail affair, and it's when they bump into each other, or something else, that they give off their light. The broad even effect that you noticed out on the water is of course due to their immense numbers, all bumping together and shining as a consequence.'

'*Noctiluca*, did you say their name was?'

'It means "night shining."'

'What causes it?' asked the boy, pushing back from the microscope. 'Phosphorus, I suppose.'

'Oh, no. The ordinary person who observes this sort of thing may *call* it phosphorescence, but as a matter of fact phosphorus isn't involved in any way whatever. "Luminescence" is a better word.... The light is due to a chemical process of some sort.'

'That's not very definite,' smiled Ted.

'You're right,' said the scientist, thoughtfully playing his fingers in the bucket of *Noctiluca*, 'but then we can't be definite when we get beyond actual knowledge. We don't understand this phase of luminescence, except that it is a chemical process and has something to do with secretion and friction. Various salts in the ocean also enter into the situation, although we don't know just how.'

Ted stooped down to gaze into the bucket. 'And those tiny little things are responsible for all that light in the sea at night!'

'They're responsible for some of it — what we just saw, for instance. But these creatures aren't the only light-giving animals in the sea. Heavens, no! There are any number of marine animals that give off light.'

'It's another case of variety, eh!'

'That's it,' nodded the scientist. 'For instance, there are a large number of microscopic forms that give light, and in addition there's a host of light-givers that are big enough to be seen with the naked eye. For example, those lights that you saw from the observation chamber were certainly produced by something larger than these *Noctiluca*.'

'Oh, yes.... I wonder what those things were.'

'They might have been any one of a number of things,' was the answer. 'It's possible that it was jellyfish that ——'

'Do jellyfish give off light?'

'Some of them, yes. One species is called *Pelagia noctiluca* precisely because it does shine at night. It has a soft blue glow. Then there's another variety of jellyfish, *Pyrosoma*, that's luminous. I remember seeing one taken out of a deep-sea trawl one time, and when I touched it with my finger the light broke out on that spot. You could even trace your name on it, because the light would follow the touch of your finger.'

The boy sat up at attention. This tale of luminous creatures of the sea was growing stranger and stranger.

'Worms and crabs and lobsters of various species are luminescent,' said the scientist, warming to his subject. 'And some corals give off light. One variety produces a violet light, for instance; and another gives off gold and green at the slightest touch.'

'What about fishes?' asked the boy, with growing curiosity.

'Fishes!' exclaimed Mason. 'Why, fishes are the most sensational light-producers in the sea. We know of deep-water species that have luminous fins, and some that have long appendages with lights at the end, and ——'

'Colored ones, or white ones?'

'Both! Last year, when we were dredging up deep-sea forms, we brought up a fish that showed lights of three different colors, all at the same time. And there's another fish in the depths of the sea that has a pair of lights like automobile headlights, one under each eye. That particular chap is found at a depth of about four thousand feet.'

'That's the wildest yet!'

'Wait a while before you give your prize!' smiled the scientist. 'Imagine a fish with a row of lights on each side, going along in the dark water and looking like a subway train!'

'Is there such a thing?'

'Yes; and there's a certain cuttlefish that lives in deep water that's got that beat. He has twenty-two different lights, some of them white, some pale green, and so on. The queerest part of it is that he has two tail-lights, and they're the same color as automobile lights!'

'Red, you mean?'

'Exactly!'

'Well, I never!' the boy shook his head. 'I didn't think there were such things in existence. Why, the bottom of the ocean must be lit up like a city street on Saturday night!'

But here Mason held up a protesting hand. 'No, that's going too far. Of course there are a good many luminous creatures in the sea, but at the same time it's a pretty dark place, especially at night. The spots of illumination are probably few and far between, or, at any rate, they're not thick enough really to light up the old ocean.'

Ted began to run his fingers through his hair with a peculiar nervous intensity. 'You're in earnest about all this light business?' he asked.

'Absolutely. It's true.... You see, you're beginning to appreciate what's meant by the term "wonders of science," that's all.'

'But what causes all those animals to give light? How can they *do* it, that's what I'd like to know.'

'So would I.'

'Don't you know?' asked the boy, in surprise.

'Oh, well, we know something about it, but not enough to boast of. Also, our information depends on the particular species you're speaking about. We know more about some than others. For instance, several of the most puzzling cases are furnished by just such tiny creatures as our friends in the bucket here, because they're small.'

'Maybe all this luminescence is manufactured inside the animal.'

'In some cases it is,' Mason admitted. 'As I think I told you, the light of the *Noctiluca* is something of a luminous secretion. In some of these minute creatures the secretion is given off by the body wall in general, and in other cases there are particular areas that emit it. For example, there is a certain deep-sea shrimp that is provided with a gland at the base of each antenna, and the light comes from these glands in the form of a liquid secretion.'

'That's interesting as far as it goes,' said Ted, 'but——'

'By the way,' the scientist interrupted, 'the higher in the scale of life you go — among the light-givers, I mean — the easier the phenomenon is to study, because the illuminating apparatus is more definitely specialized. At a certain stage in development the luminescence is no longer given off by the skin, but is handled by particular organs, and by the time we reach some of the cuttlefish and crustaceans there are regular eyelike organs, with lens, reflectors, and other necessary accessories.'

'A reflector, did you say?'

'Yes. For instance, there's a small shrimp-like creature that is often less than two inches long, and that little animal has a dozen bull's-eye organs that give light. They're so strong that you could easily read a newspaper if you gathered up five or six specimens. Curious, eh?'

The boy nodded solemnly.

'And in addition,' Mason went on, 'these specialized light organs are sometimes under the control of the animal. They can be turned on and off at will.'

Ted struck his hands together.

'That brings up just the question that I've been wondering about all along,' said he.

'What is it?'

'It's this: Here are all sorts of wonderful schemes that enable various sea animals to give off light, or lights, whichever way you want to put it. But what is the reason for it? What's the purpose of all this light? Or is there any?'

Mason gazed down at the *Noctiluca.*

'Yes, there must be a purpose,' he said thoughtfully. 'We've got to take that much for granted, Ted, because Nature doesn't do pointless things — not very often, at any rate. There are reasons for luminescence among marine animals, even though we're not so sure as to what those reasons are.'

'Do you mean science doesn't know?'

'No; I simply mean that it's like a thousand other problems — it's partly clear and partly obscure. From one angle it's very probably a method of getting food.'

'By attracting other animals?'

'That's it. Naturally a light in the dark water attracts all sorts of creatures, just as a lamp attracts moths, so that a fish that is provided with lights has a means of luring smaller creatures to come up within striking distance.'

'Clever idea. I never thought of that.'

'There's a certain mollusc,' continued the scientist, 'that has an interesting method of using its light to get food. It bores down into the bottom and hides; all that sticks up into the water is its long foot. Well, there are five different spots on this foot that give off a luminous secretion, and this light attracts various small creatures, then the mollusc sucks them down and calls it a meal.'

'Yes,' broke in the boy, 'but look at it the other way.'

'What do you mean?'

'Well, like this: A light attracts other animals, so why couldn't it attract enemies as well as victims?'

'It can. And it does. I recall one particular worm, for instance, that secretes a colored light. This brings it food, but that same light attracts a certain species of eel, and this eel is the worm's chief enemy. The eel wanders about on the bottom, and when he sees that light he wanders up, pulls Mr. Worm out of his hole, and eats him.'

'Wow! That's not so good.'

'No; but no device is perfect, you want to remember that. This very question only goes to show what a give-and-take process life is. Even while we're sitting here talking about it, there are millions and millions of creatures down in the sea that are fighting for life, trying to eat and also trying to avoid being eaten.'

'And the struggle never ends,' added the boy slowly; 'not even at night, when most of us get a little rest.'

'Not even at night,' repeated the scientist; 'in fact it's worse for many species then than it is in the daytime.... Let me show you something.'

As he said this, he began to fumble about under a table, presently straightening up with a coil of electric-light wire, with a plug at one end and a water-tight bulb at the other. He screwed the plug into a socket and went outside with the coil of wire and the glowing bulb, followed by the curious boy. Having come to the rail of the schooner, Mason silently let the light down over the side. It reached the water and began to sink, weighted by the lead sheath which surrounded its lower half.

'Watch close,' whispered the scientist; 'watch close.'

Scarcely were the words out of his mouth when the apparently empty water began to fill with life. A thickening mass of tiny sea animals came darting from somewhere, and fell to revolving about the light.

'That illustrates the eat idea,' smiled Mason. 'If a fish had this light, he could now proceed to gobble up those little fellows.'

In another moment or two other creatures began to put in appearance — worms, crustaceans, small fish that snapped eagerly at their tinier neighbors — until suddenly a still larger hunter dashed up and seized the small fish.

'And that,' said Mason, 'illustrates the eaten idea. All in all, the power to carry a lantern around in the sea may really be a very doubtful blessing.'

CHAPTER XI

THE FISH THAT FELL UP AND UP AND UP

TED woke up the next morning thinking about sea dwellers who carry lanterns about with them, but it was not long before this subject was chased out of his mind by still another variety of ocean lore. It arose in connection with their trip to Tortugas.

'You two,' said Professor Bradley at breakfast, 'had better take the motor-boat and go over to the Marine Laboratory. Develop the motion-picture films, so that we can make sure that they're satisfactory before we leave this set. You might get what mail there is, too.'

It was ten miles to Tortugas, south and west, and since there was nothing to do on the Anemone they started early. The morning was fine; the water clear and cool, the sun deliciously warm, the air invigorating. On all sides of their chugging boat stretched the ocean, its waters beautiful and forever restless, and seemingly empty of life. By this time, however, the boy had learned that the emptiness of the sea was a misleading term. He knew that its waters were crowded with many strange and marvelous creatures, even though they were not always visible to the naked eye.

'I wonder where those *Noctiluca* are,' he murmured, gazing down over the edge of the boat.

Mason did not answer. He was looking off into the water, and puckering his brows, as if he saw something. Then Ted saw it, too. It was a round transparent mass of jelly, bobbing along at the surface by the simple process of expanding and contracting and expanding again.

'That's a new kind of jellyfish to me,' observed the boy. 'Whew, there are some more.'

'We're getting into a mess of them,' said Mason, and before his companion had time to speak their boat was surrounded by the soft transparent creatures. Jellyfish to the left, jellyfish to the right! Jellyfish to the west, east, south, and north! Jellyfish everywhere they looked, packed closely together and silently throbbing along with the heaving waves.

The boy was astonished. 'I didn't know there were so many jellyfish in the world!'

'This is nothing,' observed the scientist, guiding the boat through the quivering multitudes. 'They say that ships sometimes plough into these things for hundreds of miles at a time. Well, they're petering out. It wasn't much of a crowd after all.'

Ted looked about. The jellyfish were fewer and fewer... presently the sea appeared empty once more...

'Aha!' he exclaimed, all at once. 'There's a fish that those jellyfish must have stung to death!'

The scientist turned to see. His eyes sharpened. Without a word he changed their course. The boat chugged around in a graceful curve, and came close to the dead fish, floating belly up.

'Grab it!' said Mason.

Ted scooped it up as they went past. It was about seven inches long, and in very bad shape, the eyes starting from the sockets, many of the scales gone, and the body swollen and even broken open.

'Well,' said the boy, tossing the dead fish into the bottom of the boat, 'they certainly made a mess of it.'

The scientist shook his head. 'The jellyfish didn't kill that.'

'They didn't?'

'No.'

'How can you tell?'

'Because, in the first place, this fish is not a surface dweller. That is to say, it is never found living near the top of the water. It's a deep-sea species, living at least a mile down. They are trawled up now and then, on scientific expeditions.'

'He's dead, though. And something must have killed him!'

For a minute or so there was no sound but the steady throb of the engine. Mason was giving the dead fish a careful scrutiny.

'Do you want to know what killed this fellow?' he said presently.

'Yes. This is getting to be a mystery.'

'There's no mystery to it,' said the scientist slowly. 'This fish was simply killed by falling up.'

Ted looked at him in silence. He was wondering if Mason had suddenly lost his wits.

'You mean ——' he began.

'I mean *up*,' the other laughed. 'This fish had the bad luck to fall up — about a mile, I should judge — and as a result he died.'

'I'll bite,' grinned the boy. 'What's the answer?'

Mason put down the fish, and went back to the business of steering across the blue heaving water.

'I'm not joking,' he said. 'That's exactly what happened. Of course you're thinking of gravity, and from that angle falling up sounds silly and impossible. But it's not. The whole thing can be explained by one word — pressure.

'You see, Ted,' the scientist went on, 'all living creatures exist under pressure. A human being, for instance, is surrounded by the atmosphere, and this presses in upon him from all sides. All right; as you descend into the sea you come under a new and additional pressure, which is the pressure of salt water. You'll discover that when you start in with your diving lessons.'

'Yes, but ——'

'At a depth of thirty-three feet the pressure of the water equals that of the atmosphere. In other words, a diver thirty-three feet down is subjected to double the pressure to which he is accustomed. At sixty-six feet he is subjected to three times his accustomed pressure.

The pressure increases as you descend, and of course that's why divers can't go down beyond a few hundred feet — they can't stand the pressure.'

'Then how do all those deep-sea fish stand it?'

'That's simple. They're so constructed that they *can* stand it, just as you and I are so constructed that we don't mind the pressure of the atmosphere. Deep-sea fish are in perfect harmony with the pressure they live under. Does that seem odd to you?'

'Yes, it does, because if the pressure increases as fast as you just said, it must be awful when you go down, say, even a mile.'

Mason smiled. 'It *is* awful — from our standpoint, at least. Scientists have experimented along that line, by the way, so we have some actual examples of what it's like. For instance, if you were to lower a steel safe to the bottom of the sea, and haul it up again, you'd find it crushed as flat as a pancake. That'll give you an idea of what deep-sea pressure is like.'

'And this flabby little fish could stand all that?'

'Certainly, because he's built to resist it. It's not a question of strength,' said Mason, 'it's a question of proper arrangements in the body. The point is this. What crushes an object at the bottom of the sea is inequality of pressure. But if the pressure outside a body is equal to the pressure from within that body, then everything is all right, and comfortable. A deep-sea fish gets along with his tremendous pressure simply because his tissues are so loosely made that the surrounding water penetrates them; in this way it becomes possible for the pressure inside his body to equal the pressure outside his body.'

'That's clear enough,' said Ted, gazing curiously at the broken fish at the bottom of the boat, 'but how do you explain this business of falling uphill?'

'It's not a business,' protested his companion; 'it's an accident. Look at it this way. A deep-sea fish, such as our friend here, is made to live at a certain depth. All right; he gets along nicely so long as he stays at that general depth, but if for some reason he swims too high — say, in pursuit of food — he may find himself at a level where the pressure is considerably less than it is in his home lower down. And since the pressure from within his body is now greater than the pressure from without, he becomes so buoyant that he tends to tumble up and up and up, until he reaches the surface. When this happens, the pressure from within breaks his tissues, forces off his scales, pushes out his eyes, and destroys him generally, just as you see in this specimen.'

'I understand now,' said the boy. 'Isn't it queer? We human beings just take it for granted that our way of living is the only way there is; or anyhow we think it's the best way. And that's really narrow-minded, isn't it?'

Mason nodded. 'It is, and science is the best method of getting over that narrow way of looking at things. It's a big old world, and there are all sorts of creatures in it, and our wise Mother Nature has fitted each one of her species for a particular environment. Most animals have to conform to that environment or else suffer the consequences. I'm glad we found this fish, because it will help you to realize that the ocean is divided into life zones, just as a continent is.'

'Zones? You mean that different animals have different areas to live in?'

'Something like that, yes. Take the matter of distance up and down, for example. On land some animals live at sea level, other live in hilly regions, and still others prefer mountain life.'

'And that's how it is with the ocean?' broke in the boy. 'I suppose a lot of animals live in shallow water along the shore, and others live farther down, and so on and so on to the bottom. I never stopped to think of it before, but it's certainly sensible. The environment is different as you go down from the surface — pressure, and so forth — and that calls for a different type of animal. I imagine that deep-sea animals are a lot different from the surface dwellers, aren't they?'

The scientist looked out across the shimmering water. A certain dark speck had steadily been growing larger, and now it could be identified as Loggerhead Key, the member of the Tortugas group on which the Marine Laboratory was situated. He shifted his course a bit, and answered:

'That's a tricky question, Ted. As a fundamental proposition, though, deep-sea animals resemble the forms living nearer the surface, except that they have been changed and modified to suit the difference in conditions. Of course those changes may be so great that the animal takes on a very strange look, and that's why some people think of certain deep-sea species as the wildest and oddest-looking creatures in existence.'

'Is that so?'

'Oh, yes, indeed. It's really hard to believe such animals exist, until you've actually seen them. Some of them have colored lights, as we said last night; and some of them are blind, and some are all mouth, and still others have such rubbery stomachs that they can swallow fishes larger than themselves.'

'Where do those ravenous fellows get their food?'

'From various sources. A good deal of it drifts down to them from above, in the form of minute organisms, the remains of things that have died, and so on.'

'I don't suppose there are any plants growing on the bottom of the ocean?'

'No. Plants need sunlight, and there isn't any sunlight at the bottom of the sea. Everything's dark, and very, very cold.'

'Even in the tropics?'

'Even in the tropics. After you get down about a hundred fathoms the temperature of the sea is the same from Pole to Pole. It tends to remain in the neighborhood of the freezing point of salt water.'

Ted leaned over the side of the boat, gazing down and down into the apparently bottomless sea. It was hard to believe that even on a warm summer day like this the depths of the ocean were aching with cold, and very dark.

'How deep do you suppose the ocean is?' he said.

'That depends on which ocean you mean,' said Mason quickly. 'Sea bottoms aren't all the same, any more than continental surfaces are. And if you could really get a look at it you'd see that every ocean floor has its plains and its plateaus and its mountain ranges. Probably there are hundreds of canyons down there that are so deep and wide that you could lose the Alps in any one of them.'

'Then no one can say just how deep the sea is.'

'Not unless they name their spot. It varies so. The average depth is about two and a half miles, but in places it's over six miles down, and of course near the coast it's relatively shallow.'

'H'm; what makes all this unevenness?'

'The same forces that make the surface of a continent uneven.'

'For instance?'

'Submarine volcanoes and earthquakes,' was the light answer; 'long-continued risings and sinkings, geological disturbances of all sorts. Of course you know that the surface of a continent like North America is always undergoing change. Well, it's likely that the surface of the ocean floor is constantly undergoing a somewhat similar series of changes. Probably great mountains are in the process of manufacture under the water at this very moment; chasms are being made, and so on.'

'Wow! You wouldn't think it to look at the water!' cried the boy. 'Everything's as calm as can be.'

The scientist chuckled. 'Remember, though,' said he, 'that the surface of the sea is very, very deceptive. Why, for centuries people had no idea of what went on under it, and even now we don't know any too much. I'll tell you, civilized Man has pretty well explored the land, but he's still woefully ignorant about the sea, especially the depths of the sea. Actually it's the most baffling and mysterious part of the globe. Life down there a few miles would probably be as marvelous to us as life on the planet Mars!'

Ted said nothing. He was staring out over the clear trackless water, wondering and wondering...

'There must be thousands of species of curious animals down there that have never been seen by a human eye,' went on Mason. 'Wild freaks of all sorts. It's entirely possible that there are gigantic monsters in the depths of the sea, great hideous creatures.... And that isn't all theory, because now and then a piece of some unknown monster washes up on the shore, and from our studies of it we know that the brute itself was a nameless sea giant which was probably killed and torn apart by a submarine disaster of some kind.'

The boy's eyes were sparkling with interested curiosity. 'Mr. Mason, with all those things down there, why isn't there more investigation of it?'

'Oh, we've done something,' was the retort. 'Since 1850, anyhow. Before that time science knew very little about the depths of the ocean. Have you ever heard of the Challenger?'

'I remember reading something about it, I think.'

'The Challenger was an English vessel,' said Mason. 'A group of scientists went around the world in her on a voyage that lasted three and a half years. That was in the seventies, and it was the first really comprehensive exploration of the ocean floor. The results of that voyage supplied the basis for the science of oceanography, although of course there have been many expeditions since then.'

'I suppose they used trawls and dredges to get samples of animals away down deep.'

'Yes, and all sorts of other devices, too. The vessel carried a great variety of special equipment.'

'And still we're ignorant of what's down there!'

'Yes. In spite of all we've done we haven't even a fair idea of what life is like a few miles under the surface of the sea.'

Ted was about to speak, when the scientist went on strongly:

'How can we! Imagine an airplane going out from Mars, and carrying a group of scientists who want to find out something about our Earth. Suppose they can get only within three or four or five miles from us, because of a thick layer of cloud. Then suppose they put down trawls and nets, and as they drift along these trawls and nets catch on things. Perhaps they pull treetops, and carry off a sheep, or a baby carriage, or a house-top, and so on and so on. Well, suppose our scientists go back to Mars and spend years in examining their odds and ends, after which they issue a series of learned volumes on the Earth. It wouldn't be a representative picture, would it?'

'No, I should say it wouldn't!'

'And,' said Mason, with his eyes on the pier they were rapidly approaching, 'that's our predicament. We trawl and dredge a bit, and collect a few miscellaneous samples of ocean life, but doubtless we miss most of the things down there, and probably the most clever and powerful animals get away entirely, leaving us the little ones and the weak ones. So we haven't done much with the depths of the sea, after all.'

The boy was looking over the side again, and now he could see the shallow bottom once more, sloping gradually up to the white sandy beach of Loggerhead Key.

'Well,' he exclaimed with sudden emphasis, 'you can have your six miles down, and welcome! I'll take my submarine exploring a little nearer the surface, where there's some sunlight and color, and you can see what you're doing and where you're going!'

CHAPTER XII

INTRODUCING THE NIGHTMARE FAMILY

THEY stayed at Tortugas all the rest of the morning and into the afternoon, Mason working with the moving-picture films and Ted busy with finding new things to look at.

On either side of the pier stretched an expanse of white beach, and here he found much that was interesting. At noon Mason called him in to have lunch, and afterward a friendly scientist showed the boy about the place, explaining the object of the Institution, demonstrating various types of apparatus, and even conducting him through the laboratory. When it was time to go, this new acquaintance went with them to the pier and watched his callers get aboard their little motorboat.

'By the way,' he said, 'those tarpon fishers reported a school of small fish off to the southeast, about two miles, with a pack of *Cephalopoda* after them. I see you've got a net there, and I thought perhaps you'd want a specimen or so.'

Mason pricked up his ears. 'Thanks; we'll go down that way, on our way back to the schooner.'

'That crowd said they were pretty fast,' observed the man on the pier. 'They tried jigging them, but couldn't get one.'

'I'll try the net, then,' said Mason, and started his engine. 'Well, good-bye. See you later.'

'Good-bye. Come again.'

The sturdy little motor-boat was chugging for all it was worth, and under Mason's skillful handling it was soon carrying them off to the southeast, seeking the creatures that had been referred to as *Cephalopoda*. The name was altogether strange to Ted, yet he did not ask for an explanation. This trip to the tropics had shown him that he was a regular question box, and so he was trying either to think out things for himself or wait for them to explain themselves.

'We're on the right trail,' said the scientist presently, and pointed to the water. A small fish went floating past, belly up, and apparently not long dead. 'Those confounded rascals kill just for the sport of the thing.'

The boy was becoming more and more curious. What was this creature that slaughtered fish for mere sport and left them floating in the sea! Well, whatever it was they would soon see for themselves, for by now the motor-boat had brought them close to what was certainly a violent disturbance. Mason steered straight into the troubled scene and slackened speed, whereupon Ted saw a bewildering and amazing sight. On every side the water was thick with small fish, milling around and around in an agony of fear. Now and then they parted as if a knife had cut them, scattering away from the strangest creature that the boy had ever seen.

His first impression was that it was a snake, but when he saw another of the creatures, and a third and fourth and fifth, it was clear that these were not snakes. They were gray and roundish, with a series of long writhing tentacles, and when these tentacles seized upon a fish the victim was held as if in a vise. A savage bite and the killer let go, only to dart after another fish and repeat the performance. Invariably the fish was dead, with a piece bitten out of the back of its neck.

'What on earth are those things?' cried the boy, aghast at the sight.

'Squids,' was the answer. 'Some people think a squid is an old-fashioned slow poke in the water, but those things are faster than lightning. See them go! Why, just look at them! They're swimming circles around those fish, till it's simply a case of herding them in a circle and killing them off, one by one. There must be hundreds and hundreds of dead fish here.'

'Are you going to catch one?' asked Ted.

'I'm going to try. Here, you come and steer, and I'll take the net. Keep your boat moving around and around where the squids are thickest. I'll see what I can do.'

The boy took charge of the tiller. 'You don't seem very optimistic.'

'I'm not,' said Mason grimly, and shook out the long-handled net. 'Spry is no name for these fellows.'

'I don't see how they move so fast. They haven't any fins.'

'No, but they've got a pretty good transportation system, at that. A squid has a hole or siphon through which he sucks water, and then discharges it, and it's the force of that expelling act that enables him to move. He shoots out the water with such force that he's hurled backward, with his tentacles trailing after him, the way you see. All right, my net's ready. Draw up on one of 'em, and when he turns his attention to a fish slip up as fast as you can.'

Ted located a mass of fish in the act of scattering before a sudden-coming squid. He steered there. Mason made a cast with the net, and missed. The boat turned and came back. Another cast, and another failure.

The game continued in this fashion for better than half an hour. Around and back and forth swung the motor-boat, the boy steering and the scientist leaning over the edge with the net. Again and again he brought it down upon a squid, only to have the creature dart away, or sink down, or sometimes even duck under the boat and come up on the other side. Then without warning Mason lost his balance and went overboard, head first.

'Hold it!' shouted the boy, and hastily brought the boat alongside.

The scientist crawled in over the side, still clutching his net. He did not even wipe the water off his face, he was so indignant.

'Confound those devils!' he snapped. 'I'll catch one of 'em if I have to stay here all afternoon.'

'It didn't hurt you, did it?'

'Not a bit. All right, take after another one. Try to sneak up on him if such a thing is possible.'

There was a squid not more than a rod away, but unfortunately for our hunters he appeared to be aware of their intentions. Yet he did not attempt to flee. He had another trick to show them. As they stole up on him, he simply floated in the water, a livid, hideous, squirming thing with a body as big as a man's hand, and tentacles perhaps eighteen inches long. Closer they came, and all the while the squid lay there, staring up with his dark, uncanny eyes — then the creature vanished — a cloud of ink seemed to blot him out. Mason struck, and got nothing.

'What's that black?' cried the boy, slowing up.

'That's his ink. A squid has a bag of it that he discharges when he wants to hide. He knows we're after him in earnest, now.'

'That's tough.'

'Not necessarily. Try to locate him again. He may get careless, because he thinks that ink stunt is too much for us.'

This opinion turned out to be correct. The squid was idling about, apparently relying upon his power to generate a cloud of dark water. But Mason was equal to the occasion. He watched the squid perform again and again, until at last he sent his net dipping through the ink in the right direction, and lifted it up with the squid in the meshes.

'Hurrah for our side!' shouted Ted, bringing the boat to a standstill. 'That's the time you —— Look! Look at him!'

The captured squid was undergoing a marvelous change in color, his pulsating body flushing from steely blue to green, to gray, to rusty red, and finally to blue again.

Mason held him up in the net, laughing. 'He thinks he's a chameleon.... Oh, stop it, you, it won't do any good. You're caught, and that's all there is to it.... Ted, get one of those buckets out of the nest up forward, and we'll put him in it. Better have it half full of water, so he won't crawl out.'

Plump into the bucket went the squid, shooting out his ink the instant he touched the water, and then staring up at them with his hard, cruel, lidless eyes. They changed the water, and again he discharged the contents of his sepia bag. A third time they put him in clear water, at which he gave up the struggle — his supply of ink was temporarily exhausted.

'Has he any teeth?' Ted wanted to know.

'Yes, and sharp ones, too. See that beak — down underneath. A squid can bite like fury if he wants to. Here, I'll show you.'

As he spoke, Mason took his net and dipped up a couple of dead fish, and threw them in with the squid. Instantly the creature seized them, sinking his teeth into one of them and tucking the other under a tentacle, like a greedy boy who means to keep more food than he needs.

'Those tentacles give me the shivers,' said the boy, shuddering. 'Look at the suckers on the under side of them.'

'Each one of those suckers,' observed Mason, 'is a weapon. They act like air pumps. And that's not all. Around the edge of every one of those suckers is a row of tiny claws, and when the tentacles fasten upon a fish or some other victim, those claws automatically begin to tear into the flesh. Let him take hold of your hand and you'll see.'

'Ugh, I should say not! Thanks for the invitation!'

With a laugh Mason put his hand down into the pail, and immediately one of the snaky arms seized it, clinging to it with fierce insistence.

Then the man unclasped the tentacle and hurled it back into the bucket, saying: 'He's a sticker, all right. Now look at these marks on my hand, and imagine what a really big squid could do to you in a half-hour or so.'

On his hand appeared a series of red rings, the marks put there by their little captive.

'A big squid!' said the boy. 'Why, how big do they get?'

'This particular species,' was Mason's answer, 'doesn't get much larger than the one we have here. But there's one variety, *Architeuthis princeps*, that's a real monster; he's known as the Giant Squid, and he's the largest living invertebrate. Sometimes the tentacles are thirty or thirty-five feet long, and the suckers are as big as teacups.'

'Wow!'

'Once in a while a Giant Squid even tackles a whale,' went on the scientist. 'He isn't very common, and he's almost never found away from the Newfoundland coast, and that area up there. There aren't any large squids down this way.'

'I'm glad of that. This brute here is bad enough, for me. Isn't he an odd-looking beast, though! What's he supposed to be related to?'

'The oyster, for one thing.'

'But I don't see any resemblance,' the boy protested. 'In fact I can't imagine anything looking *less* like an oyster than this thing does!'

'We'd better get back to the Anemone.... So you don't see any resemblance! Well, Ted, just remember that in biology a resemblance isn't always apparent to the layman. This rascal of a squid is actually a member of the mollusc family, although to be more definite he belongs in a subdivision known as the *Cephalopoda*.'

'What does *Cephalopoda* mean?'

'It's a Greek word, meaning "head-footed." Do you see? The squid and his relatives have a number of feet growing out around the head.'

'I thought those tentacles were arms.'

'Sometimes they're called that, but they're really feet. They're simply a development of what was once a single foot.'

Ted gazed down at the ten snaky feet of the squid. He was pondering.

'Did you say the *Cephalopoda* included some other things beside squids?' he asked presently.

'Oh, yes. For instance, there's the cuttlefish. He has a longer body than the squid, and most of his tentacles are rather short. Then there's the chambered nautilus, and the octopus ——'

'Sure, I've read about that one. Victor Hugo describes an octopus in "The Toilers of the Sea."'

'He tries to,' was the retort, 'but as a matter of fact his description is a scientific joke. Don't believe what Victor Hugo says about the octopus.'

'But it does attack people, doesn't it?'

'Now and then, yes, but the point is that its powers are greatly overrated. Personally I've never seen an octopus more than four feet across, although there are larger ones. The cuttlefish and the squid you very often find at the surface of the open sea, but the octopus prefers to prowl around on the bottom. They don't bother you very much. Of course, a big one could pull down a full-grown man, but just the same that description of Hugo's is too wild. He isn't so far off as the folks who see a squid and take it for a sea serpent, yet he's off far enough, far enough.'

Ted could not drop the subject so easily.

'Do you mean,' he asked, 'that people have mistaken these things for sea serpents?'

'That's the way it looks, yes. Naturally we can't check all the reports that we read or hear about, but in many cases it looks as if imaginative people simply saw the long tentacle of a Giant Squid and called it a serpent!'

'You don't believe there are any sea serpents, I suppose?'

'Not quite,' said Mason dryly. — 'Well, let's start the engine. The Professor will be expecting us back.'

The boy did not speak until they were under way again, then he said: 'I wish you'd explain one thing for me, though. And that's the reason for classifying the squid with the molluscs.'

'Why, I thought I did explain it. They're classified together because, in spite of their superficial unlikeness, they are biologically related. The *Cephalopoda* descended from mollusc-like forms. Geologically speaking, the primitive forms of squid and cuttlefish and octopus once had shells, but later on they lost them, the nautilus being the only present-day member of the group that has a shell which is wholly external. The others — such as our squid — have only the remnant of a shell. That's one reason they're considered so good to eat.'

'Good to eat!'

'Of course. I've seen albatrosses eat them, and we know that whales and sharks like them. The Conger eel feeds on them. So do cod and other fish. Oh, yes, they're considered a delicacy. Even human beings eat them, you know.'

'Ouch!'

Mason laughed good-naturedly. 'It's a good thing I'm a scientist, isn't it. Otherwise I'm afraid you'd think I didn't know what I was talking about. Why, certainly, people eat squid, and octopus, and cuttlefish besides.'

'They must be savages, then.'

'Some savages eat them, yes. But so do a great many civilized people. The Chinese and Japanese like them.'

'But the Europeans don't, I hope.'

'At times they do. You see, Ted, the *Cephalopoda* are not included in the religious ban against meat, so a good many people eat them during Lent. All through the Mediterranean area the natives catch them and send them to the food markets, either dry or pickled. You can see them even in the United States, in cities where there's a large Greek or Italian population. And the ancient Romans ate them. If I remember rightly they stuffed the body with spices.'

The boy made a face. 'But how do they catch 'em? I hope they don't have as hard a chase as we had with this one.'

'They catch them in different ways. Most of the species in this group are nocturnal, and at night they often come into shallow water to feed, so in a good many parts of the world people simply go out with torches and spear them. Sometimes the creatures can be forced up on shore and stranded, merely by going toward them with a light; they back up and back up and finally go ashore.'

'Good idea.'

'The cleverest way, though, is to do what the Japanese do. An octopus, for instance, likes a hole, so the Japanese go out in boats and lower jars that are attached to cords. They tie a float to the top of the cord and leave it overnight, then they come back the next morning, and generally when they pull up the jar they find that an octopus has crawled into it.'

'Well, what do you know about that!' laughed the boy.

Mason looked ahead, to where the Anemone rode at anchor. 'They say that the Japanese once used that habit of the octopus to recover some valuable porcelain that had been lost at sea,' he continued. 'They found the wreck, tied a number of octopuses to cords, lowered them to the bottom, and the animals crawled into the jars and hung on. Then all the salvagers had to do was to haul them up. How do you like that?'

'I like it. But as for eating those things! Ugh!'

'Oh, they're not bad,' laughed his companion. 'I tried one once. In the Philippines. It was my first trip as a collector, and a Moro chief gave it to me. He thought it was just about the greatest dainty in the world, so I tried it.'

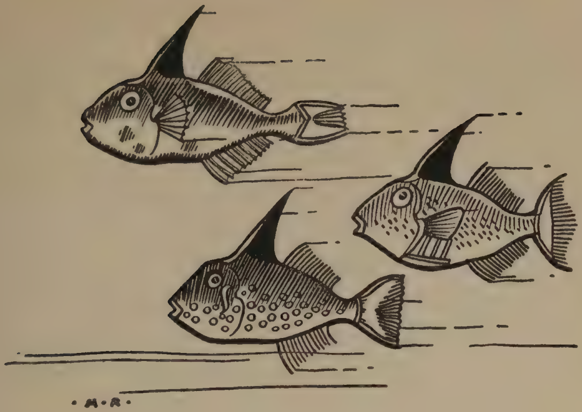
'I'll bet it gave you the colic!'

Mason fell to chuckling at the memory of that experience. 'No,' he said, at length, 'it didn't ... because I never swallowed it. I chewed on it all one evening, and when I saw that I wasn't making any headway, I spat it out. I hadn't even made a dent in it!'

'Did it make your jaws ache?'

'Did it! I should say it did; and if you don't believe me, we'll have Joe cook part of this squid we caught, and you can try it yourself.'

Ted laughed. 'No, thanks. I'll take your word for it!'



CHAPTER XIII

A DIVER'S ASSISTANT

THEY boarded the Anemone to find Professor Bradley very much excited over a new fish that he had noticed from the observation chamber that day.

'It looked as if it might be *Holacanthus tricolor*,' he told Mason.

'Our rare angel-fish, eh?'

'I think so, but I can't be sure, because they didn't come close enough for me to verify their markings. They seem to be schooling off to the south a little way, so I wish you'd go down and see what you can find out about them.'

Mason nodded. 'I'll do it to-morrow.'

This remark did not excite Ted. He merely thought to himself, 'Mr. Mason's going down to the observation chamber to-morrow.'

But when the morrow arrived, Ted learned that his friend intended to go down into the water itself, in diver's costume. Mason explained it.

'It wouldn't do any good for me to go down and peer through that glass window if the fish won't come within seeing distance. I've got to get down where they are, so that I can move up close to them. You can help me. Or has the Professor asked you to do something for him?'

'No. I don't think he wants me. He's sketching in the laboratory.'

'All right; come with me and we'll start getting ready. You can be my assistant.'

Ted followed him with a wide smile. He could hardly have wished for anything better than this. Actually he was going to act as diver's assistant, and perhaps his services would even contribute something toward the discovery and identification of the Professor's elusive little fish!

'The first thing we've got to do,' said Mason briskly, 'is to go over the apparatus.'

'I thought you did that the other day.'

'I did, but it's got to be done again. If a man is to trust his life to diving machinery, he'll do well to inspect it regularly, and often. Otherwise he may get in trouble after he's on bottom.'

The boy said nothing. This diving business was taking on the appearance of a serious adventure. He helped to get out the apparatus, then he could no longer restrain his anxiety.

'This isn't all of it?' he asked.

'Um. It's all I have down below. The pump's above water, of course.'

With this Mason spread the equipment out upon the sunny deck; and as a matter of fact it did seem scant and insufficient. There was a helmet and a long hose attached, but, except for a belt containing heavy chunks of lead, this was absolutely all.

"'What's the matter?' asked the scientist, smiling.

'Nothing,' said the boy, and sat down to help untangle the long hose which Mason had just uncoupled from the helmet. 'Only it looks to me as if half of your stuff was missing. Seems to me that when you see a diver in the movies, he's got on a lot more than this.'

'Probably so. There are different types of diving, you know. A regular deep-water outfit, such as you've probably seen in the movies, includes a complete suit of rubberized twill, a strong iron breastplate, special shoes, and several other things. But I don't go down far enough to need those things, so I use what they call the helmet method — nothing but helmet and hose, a life-line under my arms, and this lead belt to hold me down.'

'What about your clothes?'

'I wear some old suit or other, and old shoes. By the way, go get them while I tend to this helmet, will you? They're in the laboratory, behind the microscope table.'

The boy went for the shoes, and returned to find the scientist humming a tune and carefully cleaning the round steel helmet.

'I hope there aren't any sharks down there,' observed Ted.

'So do I,' said Mason lightly. 'So do I, so do I.'

'A suit of old clothes wouldn't be much protection if there were any down there.'

The scientist looked up with a twinkle in his eye. 'What are you trying to do, scare me off, so you can go down in my place?'

'I should say not!' Ted grinned. 'But it's the truth, isn't it?'

'Oh, I suppose so, but then I don't expect to meet a shark. My appointment is with some little fishies that the Professor wants to get acquainted with. It would be very bad manners for a shark to come nosing into my party down there.'

'Yes, but sharks don't have very good manners. Suppose one does come nosing around?'

'That's all right. I'll know it before he gets very close.'

'How?'

'The fishes'll tell me. A shark never dashes up on you without warning. He prowls around first. If he comes up in front, it's easy to see him, so ——'

'What if he comes up from behind?'

'In that case the movement of the fish gives you warning. They're constantly on the outlook for an enemy, and it would be impossible for a shark to get very close without their seeing him. When they see him they scatter, and of course that's a warning for the diver. Besides, I'm pretty sure that there's no shark anywhere around here.'

Ted said no more. His good sense told him that Mason surely must know what he was talking about.

'What do you think of this helmet?' said the scientist, turning it over in order to get at the inside with his cleaning rag.

'Looks all right.'

'It's a good helmet. If it were only fitted up for telephoning, it'd be perfect.'

'Oh, do some of them have telephones in them?'

'Not telephones, but telephone connections. Of course that's almost necessary for deep-sea work — salvaging, and that sort of thing; but you really don't need it in shallow diving. Still, it's a nice thing, and saves you a lot of trips to the surface.'

The boy was peeping into the helmet. 'How could this be wired for telephoning?'

'See this large round hole in the front of the helmet?' said Mason. 'That's where you screw in the face-plate. Well, on the inside of the helmet, just a little to one side of the face-plate, they sometimes attach a little transmitter. When the diver wants to say something, he merely turns his head and says it, and of course he can hear what's said to him by means of ear-phones. The telephone line is wrapped in with the air-hose, by means of special insulation.'

Ted kept his eyes on the large round helmet. Now that he looked at it, the thing did not seem so simple after all!

'What's that little thing sticking out on the right side?' he asked presently.

'That's a very important part of the apparatus,' said Mason, brushing his cloth over the knobbed projection. 'It's the air-outlet valve, and you'd be surprised to know how much work has been spent in perfecting it. The bad air escapes from the helmet through it, and at the same time it prevents the water from coming in.'

The scientist went on with his preparations, carefully cleaning and oiling various parts of the helmet, and afterward turning his attention to the air-hose. This hose came in lengths of about three yards each, joined together by metal fastenings which screwed into each other and provided a continuous airtight, waterproof channel, running from the pump to the diver's helmet. Mason took a wrench and uncoupled the sections of his hose, and then he proceeded to oil and test each metal fastener.

'Well,' said Ted, 'I suppose I'm full of foolish questions, but what happens if your air-supply fails?'

'Ah, now you're on an important theme,' responded his companion. 'What happens? Several things might follow, ranging all the way from headache to death. Too little air means that in a very short time a diver exhausts the supply in his helmet and begins to suffer from carbon dioxide, which, of course, is a poison. If the air doesn't come very soon, he may lose consciousness, and if he's not hauled up in time, he dies from suffocation, or drowning. Not pleasant, is it?'

'Hardly!'

'But that's hardly possible with this outfit,' went on the optimistic scientist. 'I go down such a short distance, and if anything happens I simply throw off my helmet, cut my lead belt, and rise to the top. If I were going down two or three hundred feet it would be more dangerous, even with the best of equipment.'

'Oh, Mason!' called the Professor, looking out of the door of the little tent laboratory, 'it's pricking on for a blow, isn't it?'

Mason glanced at the sky, and called back,

'Possibly. I'll watch it.'

The Professor disappeared indoors, whereupon Ted turned to his friend,

'What difference does it make if there's a storm, if you're on the bottom?'

'A whole lot of difference. It sets the water to rolling so that you can't stand up, and on certain types of bottom it also stirs up so much "dust" that you can't see. But I think this is going to blow over. Anyhow, I shan't back out until it looks worse than it does now. All right; you go ask the Professor for a couple of zinc tablets, and we'll be ready to start.'

The zinc tablets proved to be another puzzle to Ted Farnum. He brought back four of them, but so far as he could make out they were nothing but sheets of zinc, about twelve by sixteen inches in surface dimensions, and each of them rimmed with cork.

'That's the boy,' said Mason. 'Four, eh! Well, that's more than I'll need, but we'll take them along. You know what they're for, don't you?'

'No; I haven't the faintest idea.'

'Why, I take notes on them,' chuckled the scientist. 'With a lead pencil.'

'You write on those things, under water?'

'That's it. I jot down things that I don't want to trust to my memory. Sometimes I make sketches of this or that fish, or perhaps an odd coral growth. Of course it's only a substitute, but it helps. Now, then, we're ready.'

Without any further talk they bundled the diver's equipment into the motor-boat. Joe and Captain Nordstrom had already put the pump aboard, and, while he was waiting for Mason to get started, the boy examined this important instrument. The pump was a heavy, solid affair, provided with two cylinders and capable of supplying air to two divers at the same time.

Pop! pop! pop! began the engine of the motor-boat, and off they went, Mason and Ted and their apparatus, bent on hunting down the Professor's little fish.

They came to anchor some two hundred yards from the Anemone, and immediately began to couple up the sections of air-hose. When this was done, and Mason had painstakingly inspected the job, they attached one end to the pump and the other to the back of the helmet, arranging the intervening hose in orderly coils at one side of the boat, so that it could be paid out neatly and easily with the descent of the diver.

'Are you going to test the pump?' asked Ted.

'Yes; and I want to tell you about this pump. It runs automatically, but in case it *does* cough, or slow down, or give some other sign of not functioning properly, you must take this crank and work it by hand until I can come up and fix it. It probably won't develop any trouble, but just the same you never can tell.'

As a demonstration of how the pump worked, Mason set it to going, and when he was satisfied that it was in good order he shut it off, and picked up a collapsible steel ladder which he proceeded to hook over the edge of the boat and lower into the water.

'I could put down a weighted rope and simply slide down that,' he explained, 'but this is easier to come up. Oh, yes, before I forget it, remember to keep your eye on the bubbles that come up from my helmet.'

'I will.'

'Air bubbles rising through the water are a fair sign that everything is all right,' continued the scientist. 'If they stop for a moment or so, signal down to find out if everything is all right. As long as you see bubbles, I'll be getting air in good shape.'

'How do I signal, though?' asked Ted doubtfully.

'That's right; I haven't explained that. Just give me a pencil and I'll write it on this card. You won't need all of these, but it's just as well to have them handy. The signals are given by pulls on the two lines, and ——'

'*Two* lines!'

'Yes. This hose is one. It's called the air-hose or the air-line. The other is the life-line, and it consists of a rope. I tie one end of it around my body under the armpits, with the knot behind, and leave the other end in the boat. I'm going to use that rope right there by your feet.'

He scribbled for a minute or two, and handed Ted the card. It read as follows:

Signals from diver:
  With life-line:
    1 pull means, I want more line.
    2 pulls means, I'm coming up.
    3 pulls means, I'm all right.
  With air-line:
    1 pull means, I want more air.
    2 pulls means, I want less air.
    3 pulls means, Take up slack in line.
Signals from attendant:
  With life-line:
    1 pull means, Are you all right?
    2 pulls means, Storm coming.
    3 pulls means, Come up.

The boy read all this very slowly and thoughtfully, then he said, 'When I signal you, I pull just on the life-line.'

'Heavens, yes,' laughed his companion. 'If you pull on my air-line you'll jerk the helmet against my head. Don't touch the air-line.'

'I see.'

Once more the pump was started, and as it went on and on with its steady throbbing, Mason stepped over the side of the boat, on to the steel ladder. He signaled for the heavy lead belt, buckled it into place, and descended again, this time to the level of his waist. Between his body and his belt he fastened several articles, including two pencils, a zinc tablet folded lengthwise, and a butcher knife.

'Now I'm armed to the teeth,' he smiled. 'Give me the helmet, and remember what I said about pumping by hand, in case the machine acts up.'

'I will,' said Ted and handed him the heavy steel helmet, into which the air was pouring in short, hissing puffs.

The diver placed the helmet over his shoulders, snapped the straps that served to hold it in place, and grinned through the glass face-plate at the solemn boy. Then silently he descended the ladder, producing a continuous series of bubbles from the instant that the air-outlet valve sank beneath the surface. Ted could see him rather clearly; the helmeted figure was going lower and lower, down to the bottom, and then very slowly off into the water, like some strange and awkward inhabitant of the sea.

The boy paid out the air-hose and the life-line, and as the minutes passed he grew easier. The pump was throbbing faithfully. All was well. Occasionally he read over his signal card. Every now and then he leaned over the edge of the boat to peer about for the diver. He could no longer see him; but all at once he did see something — a great finny monster; fully six feet in length, silently stealing along in the direction that Mason had taken.

'A shark!' gasped the boy, and gave three sharp yanks on the life-line, as a signal for the diver to come up.

The monster disappeared, but at least he had not seized the man in the helmet, for the bubbles were still rising to the surface, and presently came the man himself, slowly climbing the ladder to the top. Ted hastily helped him off with the helmet.

'What's up?' asked the scientist.

'I saw a shark down there! Didn't you see him? He was going right toward you!'

A slow grin spread over Mason's face. 'Yes, I saw him,' he said at last. 'Only it wasn't a shark. It was a tarpon.'

'Oh!'

'They come around here sometimes,' said the scientist; then he jerked around to look out over the water. A long silvery fish had come to the top a little distance away, and was rolling and sending out its noisy breath. An instant later it vanished. 'There he goes now. They're harmless, and awfully shy in the bargain.'

'Gee, I'm sorry, Mr. Mason. But I thought ——'

'I know what you thought, and that's just the way to think,' broke in the other. 'Better be safe than sorry. You'd never seen a tarpon up close, and it *might* have been a shark, so there you are. It's just as well that I came up, because I broke the points off both my pencils, anyway.'

Ted hastily sharpened the pencils for him, eager to make amends for his mistake.

'I don't see the Professor's fish,' said Mason, 'but I'll try off in another direction.'

He went down again, and again the boy paid out the lines and watched the pump, and peered over the side at the rising stream of bubbles. At the end of half an hour he signaled that a storm was coming, and a little later he asked the diver — by means of one pull on the life-line — if he were all right. Mason sent back word that everything was satisfactory, and went on with his submarine operations.

Finally he came up, slowly ascending the ladder like the hero of one of Jules Verne's romances. The helmet lifted above the surface, the bubbles vanished. The boy helped him get off his equipment, and watched him climb into the boat.

'Did you find your fish?'

'No; but I think I know where they are. Now let's get back to the schooner and take care of this stuff. And I'll fix up another helmet, too.'

'Another one! What's that for?'

'For you,' Mason laughed. 'Didn't you know you were going down with me to-morrow?'

CHAPTER XIV

AN ADVENTURE UNDER THE WAVES

Ted Farnum went to bed at about a quarter of nine that night, but it was fully three hours before he got to sleep.

What kept him awake? Thoughts — thoughts of what lay before him the next day. He was to put on a diver's helmet and descend into the sea, just as he had seen Mason do.

At the breakfast table the next morning he was both silent and thoughtful. Yet no one noticed it. Mason and the Professor were busily discussing the new fish, and neither of them so much as mentioned the boy until the meal was over. Then Professor Bradley asked what Ted was going to do.

'I want to take him with me,' said Mason promptly; 'that is, if you don't mind. This is a good chance for him to get used to diving, because it's only four or five fathoms. If he begins now he ought to be a big help by the time I start on the corals.'

'Take him down, then,' murmured the Professor, 'and I'll work on our identifications. You might take a net, too, and if that fish is really *tricolor*, possibly you can get a few specimens.'

'Good idea,' nodded the younger man, and beckoned Ted to come with him.

They went to the stern of the vessel, where Mason had already spread the second diving outfit. Like his own it consisted of no more than a helmet and hose, a life-line, and a lead belt to overcome the natural buoyancy of the body under water.

'Who'll watch the pump?' asked Ted.

'Joe. He's done this thing before; in fact, he used to run the hand pump for us before we got our automatic. Got any questions to ask?'

'No.'

'Are you sure? If you have, you want to ask them, because you'll feel much easier if you understand just how everything works.'

'Well,' admitted the boy, 'I am hazy about one thing. The air.'

'How do you mean?'

'I mean I don't quite understand it — how it comes, and how much you need, and so forth.'

Mason's eyes settled upon the large round helmet which the boy was to use. 'It's not hard to understand,' he began. 'You know, of course, that all living creatures need air. You and I, for instance, breathe it into our lungs, extract the oxygen from it, and expel it. The air that we exhale is lacking in oxygen, and so far as we are concerned it is foul and must be replaced by fresh air. The average adult at rest breathes a quarter of a cubic foot of air per minute.'

'I see; but here's another thing. Does the diver always get all the air he needs?'

'He's supposed to. And while we're talking about it, I might warn you that the untrained diver generally wants too much air.'

'Too much!' exclaimed the boy. 'I shouldn't think you could get too much!'

'Oh, yes, you can. You want to remember that your horizon is going to be bounded by a small helmet, and that no matter how the screw on the air-outlet valve is regulated there is just so much space in that helmet, and no more.

'You'll soon learn,' went on Mason cheerfully. 'When you get to the bottom, you may be conscious of needing more air, and of course there's where you have to use your judgment. In case you're a bit nervous, this will increase your pulsations and cause a peculiar gasping for breath, but that won't necessarily indicate a need for more air. Just bear in mind that the pump is bringing you fresh air all the time, and that the valves have been set to give you the right volume and also to take care of the outlet.'

'Still,' persisted the boy, 'it *might* be that I'd need more air; don't you think so?'

'Certainly. Suppose that after you get to the bottom you find that you're panting and perspiring a good deal, and that you keep on feeling dizzy. Very well; those sensations may be due to too much carbon dioxide, and in that case you must signal Joe to increase your supply of air.'

'I'll remember that,' said the boy very firmly.

By this time Mason had finished his inspection, and so with Ted's help he began to assemble the two outfits.

'You ought to know about the pressure, too,' observed the scientist presently. 'Down where we're going the pressure is less than double the pressure of the atmosphere, although it may be that it will bother you as you go down.'

'How?'

'You'll notice it chiefly in your ears; at least most people do. When you get down a fathom or so, you may feel pains in your ears, and as you go lower, it may grow worse. But you can help it by one or two simple tricks.'

'Is yo' ready, Mistah Mason?' called Joe, sticking his head out of the fo'c's'le.

'All ready!' answered the scientist, and turned back to Ted. 'Let me explain what I mean before we go. As you descend in water, the pressure of air on the outside of the ear drums increases, and the Eustachian tubes tend to close. That's just what you don't want, because when those tubes are open there is as much pressure on the inside of the ear drums as there is on the outside. As long as the Eustachian tubes are open, they equalize these two pressures, and consequently prevent the pains

I mentioned a moment ago. So if you have pains in the ears, you'll know your Eustachian tubes have closed, and have got to be opened artificially.'

'Artificially?'

'Yes. There are several ways, although I never have to use more than two. One is to swallow a number of times in succession. If that fails, try yawning, or going through the motions of yawning. Either one of those methods will probably take care of you.'

Ted stored this advice away in his memory for future use.

'But whatever you do,' said Mason earnestly, 'don't get rattled. I'll go down first, and I'll keep an eye on you. If anything goes wrong, or if you think you've had enough of it, just signal Joe and get back up to the boat. Don't stay down if it seems too much. That wouldn't be brave; it would be silly. In other words, use your head.'

At this point Joe the cook put in appearance, wiping his long black arms with a red bandana.

'Ah's ready, Mistah Mason. Just what yo' say, now.'

'Fine. Help get these things in the boat, Joe, and we'll start.'

This time they cruised around a bit, Joe steering and Mason gazing down over the side in the attempt to locate what he referred to as the 'right spot for the Professor's fish.' Ted said nothing until they had anchored; then he remarked, as casually as he could, 'I don't suppose the water comes up under the helmet, does it?'

'No,' said the scientist. 'As long as the helmet remains right side up, and gets the right amount of air, the water will stay out.'

'That's a comfort,' grinned the boy, and watched Joe put the steel ladder over the side.

Mason had opened a small bottle and was pouring some colorless liquid on a rag. He then used the rag to wipe off the inside of each helmet's face-plate.

'Did we get the glass dirty?' asked Ted.

'No. This is glycerine. I put it on the inside of the glass to keep our breath from condensing and clouding the view.'

The next ten minutes were spent in getting ready for the actual descent. The two outfits were carefully separated. Each air-hose was inspected, after which it was coupled into place. The pump was tried out, and finally Mason got onto the ladder. As soon as he was provided with pencils, zinc tablet, knife, net, and lead belt, he stepped down until the water came up above his shoulders.

'All right, Ted,' he said encouragingly; 'just remember what I've told you, and don't forget that I'm down there with you, with my eagle eye right on you!'

'Thanks,' said the boy, and handed him the helmet.

With a signal to Joe to start the pump, the scientist got into the steel thing, and silently began to descend, stepping lower and lower until he was under the surface and sending up a succession of bubbles.

'Yo're next,' said Joe, giving the boy a broad grin.

'My, my! Ah got work to-day, cookin' fo' all yo' folks, an' runnin' dis pump, an' all da rest of it. Ah think Ah'll ask fo' biggah money, what yo' say, Mistah Farnum?'

Ted said nothing. He was not interested in Joe's wages just then; he was interested in what he himself was doing. Following Mason's example, he had climbed onto the ladder and was carefully stepping down until the water stood at his waist.

'Hyah's yo' belt,' said Joe, showing his white teeth. 'My, wouldn't Ah like to have dat belt, if dem lead things was gold! Or silvah, even, ma' goodness! Ah wouldn't mind so much if dey was only silvah!'

The colored man laughed and laughed, but Ted only smiled. His belt was in place, and now he was ready for the helmet. He went down to his neck, while Joe got ready to place it over his shoulders.

'Give me more air if I ask for it,' said the boy. 'That's one pull on the air-line, isn't it?'

'Yeah, yeah, one pull, dat's right, Mistah Farnum. But don' yo' worry 'bout dat. Ah'll see yo' git yo' air, all right.'

The darky threw back his head to laugh again, when a yank came from Mason's life-line. Joe glanced over the side. At the foot of the ladder stood a helmeted figure, making a slow, wide gesture with its hand.

'Mistah Mason's pagin' yo',' chuckled Joe. 'He wants yo' to come right down.'

'All right,' said the boy, and cast a hurried glance around the horizon, seeing, in the space of an instant, the blue sky and the gleaming sea and the Anemone with her riding sail slatting lightly in the breeze, and fixing all these things indelibly in his mind, as if perhaps he were never to see them again. 'All right,' he repeated, 'put on my helmet.'

Slowly down over his head came the helmet, and with it a confusion of sensations. The thing was heavy, and it shut off his view save for the barred glass in front, while from the back of it came a kind of hissing, throbbing breeze, fanning out and down in front of his face. It was the life-giving air, rushing to him with every stroke of the pump.

A moment of hesitation and he went down a step on the steel ladder. Wetness came against his neck, but no higher. Another step down. The helmet was no longer heavy; the water was buoying it up. Still another step, and in an instant the little waves were tossing against the glass in front of his face. Again he stepped down, and by this act exchanged one world for another: the strong sunlight was succeeded by soft blue-green light and fluttering shadows. Instead of atmosphere there was water.

After that he went on with greater confidence, until suddenly a sharp pain stabbed him in each ear. The pressure was having its effect. He remembered Mason's advice, and obediently swallowed a few times. This seemed to help matters, but a little farther down the ladder the pains returned. Again and again he swallowed, and afterward he yawned.

Gradually the unpleasantness in his ears went away....

One step after another, and at last a feeling that the lower part of the ladder was gone. He had come to the end, so that when he put out an investigating foot there was nothing there, nothing but water. Then Mason reached out, to guide him down the remaining eighteen inches to the bottom.

'Thank you,' said the boy, without realizing that Mason could not hear him.

They faced each other, gazing mistily through glass and water, five fathoms down. Ted could see that the scientist was giving him a reassuring nod from behind the bars of his glass face-plate. Then Mason motioned for him to take hold of the ladder and stay where he was.

The boy obeyed, whereupon his companion gave him another nod, and turned and walked slowly off along the ocean floor. A dozen steps took him to a mass of coral, and there he turned to see if Ted were all right, after which he set about looking for the fish he had come to find.

Meantime the amateur diver stood perfectly still, with one hand on the ladder. He was rapidly regaining his self-possession, for though the pains in his ears had not disappeared, they had lessened until he was in moderate comfort. Best of all, the air seemed to be coming in the right volume. It was not as easy as breathing above water, still it was satisfactory. *Throb*,

throb, *throb*, *throb*, said the pump, and because it meant air that monotonous throbbing was the most welcome sound he could have heard just then.

He kept his eyes on Mason, and to his great comfort he noticed that Mason now and then turned and looked back toward him, as if to make sure that everything was going well with him. A continuous string of bubbles rose from the man's helmet and up toward the world above, yet when Ted glanced up at the surface he could see nothing of that world. Beyond an impression of watery sunlit gauze the most intense staring yielded him nothing. He could make out bits of foam and he could see shafts of light glittering dizzily down from above, but in general the water above him was a curtain, beyond which all was hidden.

Aside from the steady throb of the air rushing into his helmet there was not a sound. This watery world was a silent world. The fish that swam to and fro made not the slightest noise. Nor did the gently undulating water. Everything down here was quiet. What was done was done in silence. A crowd of black-and-white fishes appeared at his left, swam leisurely across his view, and vanished in the dim shadows on his right hand. They had come within arm's length of him, yet they had not made a sound.

Presently he wondered if Mason had located the *tricolor*, and when he glanced that way he saw that his friend was beckoning to him to come. Very wisely the scientist had given him time to get adjusted to things, and now he was going to see if Ted could negotiate the dozen paces which separated them.

'I'll try it,' muttered the boy to himself, and let go the ladder. He took a step forward, immediately becoming aware of a strange and unnatural buoyancy. That body of his seemed so light that it was almost impossible to walk in a straight line. Once he almost lost his balance, though he had no fear of falling, because he had found that he could keep upright simply by extending one hand. The trouble with stumbling, however, was that it took Mason out of his field of vision; Ted could see only through the glass immediately in front of his face, so that objects were hidden from him unless they were directly in front. But whenever he stumbled, he managed to orient himself, and went on toward his friend, leaning against the water as a man leans against a strong wind, and walking as slowly and clumsily as a young child walks toward its beckoning mother.

A dozen awkward steps brought him to Mason's side, and there he paused, smiling to see the scientist nod approval at him. Then Mason turned and stepped away from him, at the same time untying a fine-meshed net from his belt. It was about ten feet long and five feet high, and when he had straightened it out, he gave Ted one end of it, making signs that he was to hold it. The boy took it, and Mason backed off with the other end, the water causing the net to belly out in the middle. Now the scientist stirred a great lump of a sponge, and immediately two little fish darted out from somewhere and off through the water, straight into the net. Before they could untangle themselves from the net, Mason had gathered up the ends of his trap. They were caught.

Ted guessed that the two captives were angel-fish of the rare species known as *Holacanthus tricolor*, and when he saw them struggling in the net he did not blame the Professor for wanting them. Each little fish was a rare beauty, black and gold and red, and with such an odd, flat-sided, square-tailed shape that he stepped up to look at them more closely.

'Oh!' he exclaimed suddenly, for Mason had taken hold of his arm and was squeezing it tightly. The boy looked up. His friend pointed through the water, and there to his horror Ted saw an octopus, a pale, unsightly monster that went creeping away like a specter. It writhed in behind a mass of pink coral, its repulsive tentacles twisting until it disappeared from view.

The boy turned to look at Mason. The scientist made signs that they were to get back to the surface.

They made their way to the ladder and slowly ascended it, rung by rung. Joe helped them into the boat and took off their helmets, then the boy gasped out, 'Good gracious, wasn't that a nasty-looking thing!'

'That was an *Octopus americanus*,' said Mason grimly. 'We did well to see him, because generally he hides by taking the color of his background. That chap was about five feet from tip to tip, I should judge.'

'What'll we do?' demanded Ted. 'Shall we try to catch him?'

'No; that would be a very doubtful undertaking. Even if we got something around him, we'd have to pull him to pieces before he'd let loose from whatever he was clinging to. No, we'd better not quarrel with him. I'll tell the Professor about it and suggest moving somewhere else. He won't mind, now that I've got his specimens for him.'

'Whew!' said the boy, opening his eyes. 'Do you mean we'll have to move the schooner to another set?'

'Um. That thing is evidently hanging around this part of the reef, so what's the use of taking chances with him. I don't want to, do you?'

'No!'

CHAPTER XV

SHALL WE TRAVEL OR STAY AT HOME?

Professor Bradley readily agreed to move, and as soon as the two little angel-fish were safe in an aquarium, he went to consult with the Captain. They decided to move slightly to the north and afterward east for two miles, this location on the reef being a spot they had studied in former years with good results.

It was dark before they got the observation chamber up to the surface and lashed into position for traveling, but the next morning they were off. Up went the fores'l and *throb* went the schooner's engine. The vessel trembled and began to move. Professor Bradley stood near the wheel, close to the Captain, so that he could direct him where to go. Mason and the boy stood on the forward deck, the scientist gazing ahead, Ted peering back to the spot where he had made his descent into the sea.

'Did you like it enough to want to go down again?' inquired Mason.

'I was just wishing for another chance like that,' said the boy quickly.

'Well, I guess you'll have your wish. Of course the Professor will need you in the observation chamber now and then, and he'll want you to type reports, but there'll be plenty of chances for you to use your helmet, I'm sure of that. I want you to get used to it, so you can help me when we haul up corals and take pictures and things like that.'

'That'll be great,' said Ted, and though he spoke quietly his eyes were shining with enthusiasm and interest.

The Anemone scared up a school of flying fish at this point, and by the time Dr. Mason and Ted were through watching their curious maneuvers, the Captain was slowing down. Presently the engines stopped. Mason was called to the wheel, while Professor Bradley and Nordstrom went off in the glass-bottomed boat, to spy out a good place to anchor.

They were back in an hour, and after lunch the vessel moved up. Then came a hard afternoon's work, all for the sake of getting the observation chamber down to the bottom and resting at the desired angle. Altogether they were not ready to resume operations on the bottom of the sea until the following morning.

'Will you want Ted to-day?' said Mason, as they sat at breakfast.

'Yes,' was the Professor's answer. 'I'll need him all day, but I shan't to-morrow if you'll only fix that telephone connection between the chamber and the boat. When you do that, I can telephone Joe to bring me things — providing you take Nordstrom to watch your pump.'

'I'll fix your telephone this evening,' said the younger man, 'and I'll begin with Nordstrom this morning. A little later on I want to take the motor-boat and go down to the bottom from it.'

Ted went back to the observation chamber with Professor Bradley, helping him when he could. This new view from the big window was full of life and interest, but now that the boy had been initiated into the art of diving, he was no longer content with the steel chamber. It seemed so shut in, so artificial. He longed for the time to come when he could go down in his helmet once more.

Nevertheless, he did not forget that he was there to obey orders rather than to amuse himself, and so he put his diving ambitions temporarily out of mind. Up and down the rope ladder he climbed, bringing pencils and cameras and whatever else the Professor needed. Then in the afternoon they retired to the office, to put in hour after hour at their notes.

'*Das ist aber genug!*' exclaimed the scientist suddenly, and sank into a chair.

The boy looked at him without understanding.

'That's German,' said the Professor smilingly. 'It means that is enough. We're through, young man, and I am greatly obliged to you. It was a good day's work, a good day's work. Now I'll rest my back a few minutes and net up a bit of sea water, and while I do my microscope work you may amuse yourself.'

The process of netting up 'a bit of sea water' proved to be an easy one. Professor Bradley got out a silk net, round at the mouth and tapering to a point behind, like a long mediæval fool's cap. To the mouth of this device he attached a rope and a small lead weight, in such a way that the net could be dragged along near the surface of the water, and at the same time remain open and in a horizontal position. This accomplished, they got into the rowboat, Ted to place himself at the oars and the scientist to tie his closely meshed trap on behind. It was apparent, from the tight weave of the thing, that he expected to catch microscopic creatures of some kind or other.

'Is that the kind of net they use for deep-sea trawling?' asked the boy, pulling steadily at the oars.

'This delicate contraption?' said the Professor dryly. 'Hardly.... But what do you know about deep-sea trawling?'

'Nothing, sir, except what Dr. Mason told me.'

'What did he tell you?'

'Well,' said the boy, after a moment of hesitation, 'one thing he told me was that the ocean is divided into different life zones, from the surface to the bottom, and each zone has its special animals that ——'

'Humph! that's true enough, but it's certainly not the whole truth. Young man, Mason ought to *instruct* you, instead of merely entertaining you. This is not a Chautauqua; it's a scientific expedition.

'Zones!' continued the Professor severely. 'Certainly the sea is divided into zones, but there aren't any fences or walls between those zones. There's migration up and down — within limits, of course. You should know something about *that*, along with your very general notion of zones...'

Yet the scientist himself had no more to say concerning the up-and-down migration in the sea. He simply directed the boy to turn back toward the vessel, and apparently forgot the subject. Once they were alongside the schooner, he untied the net and carefully bore it up the ladder and into the laboratory. There he placed it in a large glass jar and abruptly turned to his young assistant.

'Suppose I asked you to count the multitude of animals in this jar,' he demanded, 'how would you undertake to do it?'

'I'd put them under a microscope,' was the reply, 'and count them that way, a few at a time.'

'H'm... that's correct. Did Mason tell you that?'

'No, sir. I just figured it out for myself.'

The Professor began to rub his beard, now and then darting a sharp glance at Ted. 'So you're beginning to figure out things for yourself, are you! Very well, figure this out,' and he picked up a chart which showed the outline of ten or a dozen very strange and rather shapeless organisms. 'What are they?'

The boy could not say.

'Well, I didn't expect you to know,' said the Professor. 'But you might guess.'

'I suppose,' said Ted slowly, 'that they're rare species of some kind.'

'Not at all, not at *all!* You know the name of every one of these species. Young man, there are people who spent years studying such creatures as these, thinking them to be new forms; and then they discovered that they were simply the temporary stages of various familiar creatures. For instance, this one is a young worm.'

Ted gazed at the blunt peculiar shape the scientist had pointed out.

'Doesn't look like a worm to you, does it?' asked the Professor.

'No, sir, it doesn't.'

'Neither does a caterpillar look like a butterfly,' was the retort. 'Many sea animals pass through various stages of development, and that explains it. Now I must get to work. But just one question. Tell me, what does every living creature want to do?'

'It wants to go on living?'

'Absolutely! Continued life is the problem which faces every living organism. And so far as marine animals are concerned, one of their chief questions is, Shall we travel or shall we stay at home? Understand that?'

'No, sir, I'm afraid I don't.'

'Nonsense! Think it out, or if you can't do that, ask

Mason. I haven't time to talk any more. You're excused.'

So saying the Professor drew out his microscope and went to work with the contents of the net, leaving Ted to wander off by himself. He was a little amused at the scientist's peculiar manner, but he was also puzzled. All that day he pondered the question which Professor Bradley had put to him, and without success. After supper he gave it up and went aft, to where Mason was tinkering with a telephone connection for the steel chamber. The boy told him all about it, even to the strange question, Shall we travel or stay at home?

Mason heard him to the end, alternately nodding and chuckling. 'Congratulations,' he said. 'The Chief has accepted you, Ted. Up until now he's been studying you without comment, but his talk with you this morning means that he approves of you. He has decided that you're worth while.'

The boy shook his head. 'How could he, when I'm so dumb? What would he say if he knew I can't figure out his question?'

'Bosh! Don't worry about that. A question like that would stump a great many college students in biology.'

'Then what did he ask *me* for?' demanded the boy ruefully.

'So you'd ask me,' was the smiling rejoinder. 'Professor Bradley thinks you're worth teaching, and he knows you and I have a good deal of time together, so he's merely encouraging us to talk things over.'

'Oh!'

Mason paused a moment to look off to the west, where the sun was sinking in a blaze of golden red-tinged glory, then he came back to his task of wiring a telephone receiver for Joe.

'It's something like this,' he began. 'Every creature in this old sea of ours needs food and a chance to perpetuate its kind. All right; the first thing for a species to do is to get itself widely distributed, so that life won't be too crowded and hard around the old homestead! So just as dandelion seeds, for instance, have the power to drift off to fresh pastures, so the young animals of the sea are given the power to swim around during their earlier stages of growth.'

'Animals besides fishes, you mean?'

'Yes. Fishes, sponges, corals, anemones, worms, barnacles, crabs, oysters, and so on and so on — they all go swimming, soon after they're born. If you recall that sketch which the Professor referred to as a young worm, for example, you'll remember seeing some fine hairlike processes attached to it. Do you?'

'Yes, I remember.'

'Those are cilia, and they're one very common method of paddling around in the water when an animal is in its infancy.'

'Now I'm beginning to see,' said the boy quickly. 'Millions of different kinds of marine animals go swimming around at the surface, when they're young and tiny, so they can get food and grow.'

'Um; and at the same time this swimming or paddling stage serves to scatter them. Then after a while Nature prompts them to ask themselves the question, Shall we travel or stay at home?'

Ted's face contracted. 'Yes, but that's what I don't understand.'

'Let me explain it. In the first place, the surface of the sea is thick with millions and billions of small creatures of different species, many of which are in the process of growing up. When they become adults, they will differ a great deal among themselves. Some will be fishes, others snails, others squids, others corals, and others something else. All right; this means that as adults they will live under widely different conditions, and this in turn means that they will have to adapt themselves accordingly. So as they grow up they decide on different methods of getting what they need — or rather Nature decides for them.'

'But how about the travel idea?'

'I'm coming to that. To go back a minute, our young animals must have some assurance of continued food and life. For example, how are they to get food after they've outgrown the surface-swimming stage? Shall they travel after it, or shall they set up housekeeping in some particular spot and arrange to have their food delivered? Well, some species answer the question by developing into free-moving adults, and others change to various types of settled life, according to Nature's plan.'

'Still I don't get it,' protested the boy.

Mason smiled in the friendly, patient manner which was characteristic of him. 'Then we'll have to take some examples. Let's begin with fishes and squids and creatures with the same general powers in adult transportation. These animals simply continue to swim freely all their lives in search of what they need. They answer our question by saying, We shall travel.'

'Oh, now I see! And others answer it by settling down.'

'That's it. Of course, there are various degrees of settling down. The crabs and lobsters, for instance, merely go into second gear, as you might say. When they're very young, they swim around at the surface in very active style, but later on they sink to the bottom and slow up to a crawl. Somewhat the same thing happens to the sea-urchin, and the starfish, and the mollusc.'

'What about the sponge?'

'The sponge goes a step farther and answers the question by deciding to stay at home and let its food come to it,' said the scientist drolly. 'When a sponge is a baby, it swims about at the surface, but later on it changes its form and settles down to the bottom and takes root. Ordinarily it never travels after that.'

'But how does it get its food?' demanded Ted. 'It has to do something more than just *order* it!'

'Don't worry about the sponge,' chuckled Mason. 'It does more than order its food; it sees that it's delivered, and right to the door, at that! A sponge is full of holes which lead to canals, and these canals lead in past a primitive digestive apparatus and back out to the sea. Well, the edges and sides of these canals are lined with tiny cilia which are constantly in motion, and this motion causes water to flow in through the sponge. The water, of course, contains bits of food, and the sponge seizes these as they drift in and along the canals.'

'That's clever!' exclaimed the boy. 'I should think more sea animals would think of that.'

The scientist shook his head. 'Ted,' said he, 'we don't use the term "thinking" to describe such adaptations as the sponge's way of getting a living. Arrangements of that kind are simply the unconscious devices of Nature. The stinging cell is another instance of the same thing.'

'Sponges don't have stinging cells, do they?'

'Oh, no. But other marine animals do, and while we're talking about traveling and settling down, you might notice how the stinging-cell idea helps to answer the question.'

'Now I'm all mixed up again,' said the boy, with a short laugh. 'I understand the sponge's method pretty well, but I don't get the idea of the stinging cell.'

'You will when I explain it,' Mason answered. 'Of course there are stinging animals that move about freely, but let's confine ourselves to the settled type. A coral is a good example, because the infant coral swims about in the water and afterward settles down on the bottom. As an adult it gets its food by means of tentacles and stinging cells.'

'I'd like to see how that's done,' said Ted thoughtfully. 'Maybe I shall next time I go down to the bottom.'

'Why go so far?' smiled the scientist. 'If you want to see how the stinging cells help an animal to get food, just come inside and I'll show you.'

The boy got to his feet with unconcealed eagerness, and as soon as Mason had put away his work, they went into the laboratory. Pausing before a small aquarium, the scientist took up what looked like a tiny fir tree.

'This is not a coral,' he explained; 'it's a member of the *Hydrazoa*, popularly known as the sea-fir. But it'll do just as well as a coral to illustrate our point.'

In another moment Mason had skillfully transferred a minute branch of the sea-fir to a little glass trough of water, after which he placed the trough on the stage of the microscope and adjusted the instrument. Then he drew back, and told the boy to look.

Ted bent down to see. He saw the greatly magnified branch of the sea-fir, with little cuplike projections here and there upon it. At first there was no movement whatever, because the startled little animals had retired indoors, but presently they recovered themselves. One little cup and then another and another began to bloom from the top, each one opening like a flower, except that instead of petals there was a circle of slender waving tentacles around the edge of a hungry mouth.

'See anything?' asked Mason.

'You bet!' said the boy, and kept his eye to the microscope. He was witnessing a series of battles and tragedies down there. The tentacles of each little animal kept waving out from its cup, and every now and then minute specks of food were caught and drawn into the mouth. Sometimes the victim was a living morsel, but when the tentacles touched him he struggled only for an instant, and then stopped moving, only to be swallowed by the ravenous mouth of the sea-fir.

'Whew,' said the boy, 'those tentacles must be strong.'

'They're not so simple and harmless as they look,' explained Mason. 'Each one of those tentacles, Ted, is covered with a number of stinging cells. In each cell there is a coiled thread, kept in place by a kind of hair trigger. Very well, this trigger is so sensitive that it releases the thread the instant anything brushes against the cell. The thread is hollow and has a barb on the end, and when it shoots out, it pierces the victim and allows a poisonous fluid to pour into him. If the victim struggles, this touches off more cells and releases additional stingers, until finally he gives up.'

'So that's how the stinging cells work!'

'That's how they work in the case of the sea-fir,' was the careful answer. 'But don't forget that there are different kinds of stinging outfits. In some animals they are scattered over the body, and in others they are grouped in batteries. There are cases in which the cell is ruined once the stinger is released, and so it's cast off and a new one is grown; but in other animals the thread can be withdrawn from the victim's body and recoiled within the cell, for use another time. No matter what the arrangement is, though, it's a scheme for getting food. Rather clever, isn't it?'

Ted straightened up from the microscope. 'Clever!' he exclaimed. 'It's so clever it's uncanny!'

CHAPTER XVI

HOUSE-BUILDING ON THE OCEAN FLOOR

A WEEK of labor in the laboratory and in the steel chamber at the bottom of the long flexible tube, and then Ted was permitted to try his luck at diving again.

This second venture was a complete success. He stayed down for forty minutes, and came back up the ladder bursting with enthusiasm. In the days that followed, he descended again and again, more and more at ease, and more and more eager to study the busy life of the coral reef. Best of all he loved to sit down on a patch of white sand and gaze out through the water, for it was at such times that he learned so much that was curious and wonderful. He came to know more about the habits of fish; he got so he could distinguish between different species; and by degrees he grew to appreciate the marvelous skill with which Nature had fitted together so many different types of life.

'Still enjoying it?' said Mason, one day. They had just come up from the bottom and were wiping themselves dry.

'It's the greatest experience I ever had,' was the quick response. 'And I certainly thank my lucky stars I won the chance to come down here. I wouldn't have missed it for anything, especially this diving part.'

Mason nodded. 'It's the best part, no doubt about that. But we'd better quit for to-day. Mustn't overdo it.'

'All right,' said the boy, for, although he would have preferred to go down again, common-sense told him that the scientist was right. Too long a session under the water developed a tendency to chills; therefore it was best to take their diving in relatively brief doses.

Back to the Anemone they chugged, to put away the equipment and straighten out Mason's notes, after which they went out on the deck. The Professor had gone to sleep in the laboratory, hence their reason for not using the microscopes, as Mason had planned.

'Looks like a storm coming,' observed Ted, glancing at the dark clouds which were rising up from the horizon.

'Probably a false alarm,' was Mason's comment. 'But if it does blow, we shan't go down to-morrow. Things aren't very pleasant for a diver when it storms.'

'No; but think of the fish and the other things that have to live down there, storm or no storm,' said the boy thoughtfully. 'You know, it must be awful not to have any shelter when ——'

'Oh, I wouldn't say that,' protested Mason. 'What about a coral reef? Sea animals hide away in that in practically the same way that land animals hide in the woods. Haven't you noticed it by this time?'

'Yes, I have; but that kind of shelter is so — so — well, I don't know, but it's so full of holes! It's like standing under a tree. I wouldn't call it a *real* shelter.'

'Why not? The holes in a coral reef are as good as a house to our friends down there on the bottom.'

But Ted insisted on his point. 'That's just what I'm driving at. Land animals generally have definite places to go — such as nests and dens; but sea animals don't seem to have anything like that.'

'You're wrong,' said Mason. 'A great many species of sea animal have a definite place to take refuge in.'

'But they never have what you could call a *house*.'

'I don't know about that. A house doesn't have to be like ours, and have a piazza and a front door, to be a house! A house is really nothing but a specially constructed shelter, and there are certainly a good many sea dwellers that have that much. Take the hermit crab, for instance. A hermit crab is a corking example of a house dweller; in fact, he spends most of his time moving in and out of houses, even though they're the houses of other animals. He's like a man with a growing family, because he's always in need of roomier quarters, except that in the case of the crab it's his own body that grows, not his family.'

Ted kept silent. He did not think much of the housekeeping tactics of the hermit crab, but he was willing to hear more about it before he said so.

'Do you remember what we were saying about young sea animals swimming at the surface?' asked the scientist.

'Yes.'

'Well, that applies to our friend, the hermit crab. Like all the other crabs, he swims around at the surface of the water when he's a little chap, but when he's about a quarter of an inch long, he sinks down and starts prowling around for a house. Generally he tucks himself into the cast-off house of some small shellfish, going in tail first and keeping his claws and head at the entrance. From then on he keeps his eye peeled for a bigger and better house — because he's growing; and up to a certain stage he periodically moves into a larger shell. He keeps this up until he is finally established in, say, a large whelk shell. Of course he has to fight a good many battles with other crabs to get possession of what he wants. Why, I've even seen hermits fight for a shell, and after one of them had finally got it, and found out that he didn't like it as well as the shell he had before, he'd start in fighting again, to get back his first house! Doesn't that sound human?'

Ted chuckled. 'It certainly does; but I don't see that the hermit crab builds a house. He steals it.'

'That's so, of course.'

'And there aren't any house-*builders* in the ocean?' asked the boy. 'I mean besides shellfish.'

'Yes, there are,' said the scientist. 'But why look down on the poor shellfish? They build houses. Look at the barnacle, for example. There's a marvelous case of house-building.'

'The barnacle you see on the bottom of ships?'

'Yes, that's one kind. There are a number of varieties.'

'Barnacles build houses, you say?' asked the doubtful Ted.

Mason sat down on the warm deck, pulling his hat low over his eyes to shut out the westering sun. Ted followed suit.

'They certainly do,' declared the scientist; 'and what's more they do a good job at it. Now, listen, and see if you don't think I'm right.... The parent barnacle has a shell, and on the inside of this shell you'll sometimes find eggs. When the babies hatch, they leave the shell and swim away.'

'What with, fins or cilia?'

'Cilia. Well, to go on, a baby barnacle is a queer-looking specimen, and not at all like the adult animal. He's triangular in shape, and he has three pairs of legs and only one eye, and on his back there is a delicate little shield. This little fellow swims about with a jerky motion, eats all he can, and grows for all he's worth. Finally he develops two large eyes, a pair of antennæ, and six pairs of swimming legs. Then he paddles around for a place to settle down.'

'I hope you're not going to tell me that he steals a house, like the hermit crab!' Ted interrupted.

'Oh, no. Don't accuse a barnacle of that. He makes his own house. Suppose he decides to build it on the hull of a ship, such as the Anemone here. All right; he attaches himself to the wood by means of a tiny sucker-like disc on the end of each antenna, so that from then on he's practically standing on his head.'

'Shame on him!'

'But he gets busy, in spite of that,' Mason went on. 'At the base of each of his antennæ he has a cement gland, and by means of these he produces enough glue to stick himself fast to the ship. Then he grows the acorn-shaped shell that you're probably familiar with. The eyes disappear, because from now on the barnacle will live in darkness, so naturally he hasn't any use for eyes. The swimming legs grow out into curved feathery appendages, and when the barnacle wants to eat, he opens his door, puts out his legs, and kicks food back into his mouth.'

'Whew! That's one way to do it, I suppose. But did you say something about a door?'

'Yes, there's a door. The top of the barnacle shell is a snug-fitting door in four pieces, and when the animal is frightened or wants a little privacy, he simply jerks in his legs and snaps the door shut. And when it's shut, it's shut tight, you can depend on that.'

'That trapdoor certainly sounds like a house,' said the boy slowly, 'so I guess I'd better take back what I said about there being no real house-builders in the ocean.'

'All right; but don't imagine the barnacle is the only house-builder in the sea,' said Mason. 'He's only one among many.'

Ted nodded. 'I suppose so. But do any of the others make trapdoors?'

'Oh, yes. For instance, there are certain sea worms that are tubular in form, with a trapdoor on top. Some of them even have a sharp spine on the outside of their door.'

'That ought to be protection enough.'

'Not always. I'll tell you what I've seen, Ted. I've seen a worm put out his tentacles to feed and get nipped before he could pull them in and shut the door. A fish will slip up, rest a moment, so as to keep the worm from suspecting anything, and then bite off a tentacle as quick as a flash.'

'What kind of body do those worms have, hard or soft?'

'That depends on the species. By the way, there are some worms that cover themselves with very small stones or shells, so as to harden their bodies. One variety of worm sticks grains of sand into itself, and does it so skillfully that when you look at the job with a magnifying glass, the grains appear to be of almost exactly the same size, and very evenly and systematically arranged. Some of the anemones do the same sort of thing.'

'That's really making your body over into a house, I should think.'

'Well, it strengthens the body wall, at any rate,' said Mason, always cautious in his answers. 'By the way, Ted, I noticed another kind of house-building going on down below, just before we came up to-day. Did you see it?'

The boy looked disappointed. 'No, I didn't,' he murmured. 'Huh, I guess it's just as the Professor says, the brain can see more than the eye.'

'You need brain and eye both, and you need them working together,' was Mason's answer. 'But you're improving. It takes time.'

'I'm going to look for those house-builders,' said Ted suddenly. 'Next time we go down I'll play detective.'

The boy found out that it was one thing to sit and hear Mason tell him what went on at the bottom of the sea, and quite another thing to gather information by himself! It was true that his eyes were growing sharper and his mind keener; nevertheless, it was not so easy to peer through a thick glass and into a mass of shadowy, undulating water, and see just what was going on among the tiny creatures of the deep.

'Find those houses?' asked Mason, a week later.

'Not yet,' said Ted.

Day after day went by, and day after day the divers descended, Mason pursuing his scientific observations and the boy looking about for submarine house-builders. Then one afternoon he found a clue — no, it was not a clue, it was positive proof!

He came closer and carefully got on his knees, to see better.

There in the sand at the bottom of the sea he saw a tiny creature about two inches in length, pushing at a wad of something. He recognized the animal as a shrimp, and while he knelt there watching it he saw a second shrimp come out of a hole and help its companion. Whereupon he concluded that they were building a house.

This theory turned out to be correct. The little creatures were digging a long gallery under the surface, tunneling with their claws and afterward pushing the loose sand back and out of the way. It was for all the world like a pair of foxes making a den, and as soon as the divers had gone back up the ladder to the boat and had their helmets off, the boy burst out with his discovery.

'They even used brains at it,' he declared; 'because there was a chunk of sand sticking out over the mouth of the burrow, and one of the shrimps crawled up and tore it down, just the way a person would take down a loose plank that might fall and hurt him. It doesn't sound possible, though, does it?'

'Why not?' said the scientist smilingly. 'Don't underrate the intelligence of the lower animals. If you do, you'll be astonished more than once.'

Back on the schooner once more, Mason disappeared into the laboratory, leaving Ted to take care of the diving apparatus. The boy worked away with a will, thinking to himself, and wondering how many different kinds of house-builders were at work on the ocean floor. Probably crabs and lobsters constructed special dwelling-places, because these creatures were related to the shrimps.... But how about fishes? Did fishes ever build houses? He must find out about that.

The more he thought about the problem, the more curious he became, and when his work was done, he went into the office and took down a book on fishes. After a short search he found a passage describing the remarkable house, or nest, which is constructed by a fish called the stickleback. This creature, apparently, was very skillful in building a real dwelling-place, for unfortunately it seemed to be primarily a fresh-water species. At any rate Ted could find no hint that the stickleback lived in the neighborhood of the Florida Keys.

However, the book did mention the fact that certain salt-water fishes construct shelters for themselves, and even though it said nothing more Ted found this encouraging. Two days later, he had another opportunity to descend to the bottom, and as he got into his helmet and started down the ladder, he told himself that he was going to discover a house-building fish or know the reason why.

But somehow he had no luck. An hour later, he came up the ladder, willing to admit his defeat.

After supper that evening he said to Mason, 'I don't believe there *are* any house-building fish down there.'

'Yes, there are,' persisted the scientist, giving him a teasing look.

'Are you sure?'

'Positive.'

'But how can you be positive?' demanded the boy.

'Because I saw a burrowing fish this very afternoon.'

Ted's jaw dropped.

'This burrowing fish,' said Mason calmly, 'digs a pit in the sand, then he piles stones or bits of shell around the edge of it.'

'How does he do that? A fish hasn't any hands.'

'No, but a fish has fins,' was the retort. 'And a fish has a mouth.'

'Does this fish pick up stones in his mouth?' asked the boy.

'Exactly. He brings them one at a time and places them on the edge of the burrow. Then he banks sand against them, so they'll be solid. Sometimes he'll slide into his house tail first and do his masonry from the inside. I've even seen these fish place a stone and remove it, and place it again and again, until they were satisfied with it.'

'How deep are those houses?'

'Twelve inches, perhaps.'

'And the fish lives in there?'

'You might say that, yes. The fish slides in tail first, and keeps his head just above the level of the door, waiting for food to come by. Or in case he wants to retire for some little time, he draws in a piece of stone, in such a way that it will fit the top of the house and conceal it from view.'

Ted looked disgusted with himself. 'Funny I never saw any of those houses,' he muttered.

'Well, they're hard to find,' said Mason kindly, 'unless you just happen to stumble on to them. I don't know that there are any examples of this particular kind where we're working now. I've seen the fish, but I haven't seen his house.'

'That's what I was going to ask you,' began the boy, when the scientist interrupted gayly, 'There's another variety of fish-house down there, though.'

'What!'

'Why, certainly; and if you want to look for it I'll tell you about where it is,' chuckled Mason. '*About* where it is,' he added.

'All right,' grinned Ted. 'I'll be glad for even that much of a clue. Where is it?'

'It's between six and fifteen feet west of where I shall be working to-morrow,' laughed the scientist. 'Now let's see you find it.'

This was enough. Ted went down the ladder the next day with all his wits about him. Off from the foot some twenty-five feet he could see Mason sitting on a folding chair and making notes on his zinc tablet. The boy immediately walked toward him, got his bearings, and paced off five yards to the west. Then he turned and looked back. Somewhere between himself and the scientist there was the house of a fish. Now to find it!

An hour later he was still searching. He had found no clue, and since the divers had not come down until considerably after noon there would not be much more time to hunt. Already the shadows were lengthening. A little while and Mason would lead the way up to the boat.

For perhaps a quarter of an hour more Ted stood gazing about, silently puzzling. He could see sand, and he could see corals, and he could see anemones and sponges, but he could see nothing that resembled a dwelling-place for fish, until suddenly he noticed a strange fish that appeared to be idling along the bottom just over a heap of coral fragments.

With a thrill of expectancy the boy advanced toward this fish, forgetting that it is impossible to hurry under water, and consequently losing his balance. In his excitement he threw out his hand and grasped the branch of a coral, thinking to steady himself, but no sooner had he done so than a multitude of little barbs came sharp against his bare flesh. He turned with a gasp, wondering what had happened. The polyps had stung him, after which they had withdrawn into their cups, leaving the coral a pale yellow in color. It was like magic.

The stinging had not hurt him, but it had caused him to look away from the fish he was after, and now when he returned to the search he saw, with a sinking heart, that the creature had vanished. Fortunately, however, he did not despair. Instead, he came closer to the pile of coral fragments and knelt beside them, suspecting that they had been brought here for some deliberate purpose. He peeped into the heap and found to his glee that the pieces of coral had been made into a kind of house, and that the missing fish was actually inside, calmly looking out at him.

By this time Mason was coming toward him, on his way to the ladder and the upper world of air. Ted signaled for him to come and look, and when the scientist had knelt beside him, the boy took up a piece of coral and dropped it into the fish's house, whereupon the creature immediately seized the rock in its mouth, brought it out, and let it fall away from the burrow.

Mason took hold of the boy's hand and held it on high, then as Ted peered through the water at him, the scientist slowly made these words with his lips,

'You... win.'

CHAPTER XVII

CAMOUFLAGE

But Ted Farnum did not spend all his days beneath the surface of that tropical sea; on the contrary, there were long periods when he did not go down at all. There were times when he had to help in the steel chamber and in the laboratory and office, and upon other occasions he was set to rowing about in the neighborhood of the vessel, for the purpose of gathering specimens.

He liked this latter task. He was proud of the fact that the Professor was willing to send him out alone, even though it was simply to tow a net here and there, and bring it back to the Anemone for examination. Moreover, Ted was discovering that the blue clear surface of the sea was full of tiny but fascinating creatures of all kinds. There had been a time when he saw nothing but water; now, however, he was seeing with his brain as well as a sharpened eye.

June passed, and on its heels came July, warm and calm and peaceful. The boy was more thoughtful than before, and leaner and browner and older. Of an evening he wrote letters home to Baltimore; or else talked with Mason on the forward deck, all the while gazing out over the moonlit expanse of waters and thinking of all that those waters concealed. Nevertheless, the sea was hiding less and less from him, and, although he still had to ask the reason for many things, there was many a puzzle that he solved for himself.

For example, Ted himself discovered a whole series of water-dwelling camouflagers!

It began in this way: He had gone out in the rowboat, provided with a dip net, a magnifying glass, and instructions from Professor Bradley to ladle up a supply of young prawns. A month earlier Ted would not have known what a prawn was, but by now he had learned that it was a small relative of the shrimp, the crab, and the lobster. More than that, he knew what very young or larval prawns looked like, so when he found them upon the heaving surface of the sea he scooped them up.

The young prawns were rather hard to find, because they were virtually transparent. Ted took up a few of them in his hand, and proceeded to examine them with his magnifying glass. To his astonishment he could see clear through them. Even the beating of the heart was apparent. Nothing was concealed.

'Talk about your goldfish!' chuckled the boy to himself; 'a goldfish has all kinds of privacy compared to these things. They can't even keep their inside business to themselves!'

Ted began to think about this matter of transparency. From Mason he had learned that everything in Nature has a purpose, but what could be the purpose of this?

Then all at once an explanation occurred to him. Life was full of danger for the tiny prawns, just as it was for numerous other young paddlers in the sea. Such creatures were the babies of the ocean; they were powerless to protect themselves, and if even one of their huge enemies came along with his mouth agape, thousands or perhaps millions of the little fellows would perish. This being the case, how could the wise Mother Nature help them? By keeping them from being seen! And how could she do that? By making them practically transparent during their baby stage!

'I believe that's it,' murmured the boy, as his idle boat rose and fell on the water. 'Why not? If your enemies can't see you, they won't come at you on purpose, even if they do happen to gobble you up by accident. It's just like an old fairy tale, where a kind fairy makes you invisible, because there are a lot of dragons and ogres around.'

Ted was satisfied with this explanation. He did not have to run to Mason or Professor Bradley and ask them if it were true, because his own intelligence told him that it was.

He began to pursue the idea of camouflage still further, just to see what he could do with it. His mind fell upon the octopus, that hideous, ghastly creature that he and Mason had seen slinking away into a cave in the coral reef. Ted remembered that the thing had been hard to see, probably because the octopus was imitating the tints and shades of his background. In other words, it was camouflage!

That evening he talked it over with Mason, and found that his friend agreed with him perfectly. 'And the squid is another example of the same thing,' said the scientist. 'Don't you remember the chap we caught, coming back from Loggerhead Key, and how he switched from one color to another while I was hauling him into the boat? He was trying to conceal himself by looking like his background.'

'Yes; and all this color stuff must be connected with camouflage,' exclaimed the boy, eager to tell the rest of his ideas on the subject. 'Here's something I've been figuring out, if you don't mind giving me your opinion on it?'

'Go ahead.'

'It's this,' said Ted, in a business-like tone. 'I've noticed that a great many fish are colored one way on top and another way on their under side. I mean their backs are darker than their bellies. Well, when you're on the surface of the water, and look down on those fish, their backs are pretty hard to see; and when you're on bottom and look up at them, I notice that their light-colored bellies are a pretty good match for the water. Now what I'd like to know is this: Does Nature tint them that way as a matter of camouflage, so they'll be hard to see no matter which way you look at them?'

He waited eagerly for Mason's reply. The scientist told him that he was probably right. The sea illustrated such a multitude of diverse and even contradictory things that Ted had been inclined to look upon it as a hodgepodge, interesting but confusing. Lately, however, he had found that he could study the sea systematically if he followed out one idea at a time. Camouflage was one such idea. He had made some progress with it, and he proposed to go still further with it.

Several days later he was out in the rowboat again. Some of the Gulf Stream came that way, on its way east and north, and when the wind was right, this current brought with it great quantities of yellowish-brown seaweed, of a kind known as sargassum. By chance Ted had discovered that under this seaweed was a good place to dip for marine larvæ, and after that he frequently sought it out. The explanation was simply that a variety of small creatures used this floating sargassum as a concealing shelter.

But it was not tiny microscopic larvæ that interested the boy on this particular morning. He was after a larger creature, and before it was time to row back to the Anemone he had found what he wanted. It was a fish, yet it was also something more, because of the strange way in which Nature had modified the thing. This fish was colored to look like seaweed; it was so peculiarly shaped as to resemble a sprig of that same weed; and in addition the creature was ornamented with a number of leaf-like processes which heightened its similarity to floating sargassum.

He took the fish back to the vessel with him, his brain fairly popping with ideas. 'My notion of it,' he said to Mason, 'is that this fellow is a master of camouflage, because he works it two ways. In the first place, this looking like seaweed helps him to escape the attention of his enemies; and in the second place, this same disguise helps him to sneak up on animals that aren't as big as he is. Then he eats 'em!'

'That's not quite scientific language,' smiled Mason, 'but you've got the idea. This fellow you have here is the mouse-fish, and he does just as you've surmised. There are a number of other things that use sargassum as a shelter — crabs, shrimps, and different small fish — and your mouse-fish gets along in the world by eating a good many of these. By the way, there's another very interesting camouflager under this seaweed.'

'What's his name?'

'He's called the pipe-fish. If you've seen him, you'll know why, because he's not only the color of seaweed, but he has the long slender shape of a piece of sargassum.'

'I never saw him,' said Ted; 'but tell me, does the mouse-fish always live under that yellow seaweed? I've been wondering about that.'

'Yes, he spends his entire life there, drifting along with it.... That sort of thing is not always the case, though. Other fish are colored to suit one environment when they're young, and then, when they grow up and move to a different habitat, their color shifts to fit in with their new home. Ever hear of the triggerfish?'

'No.'

'When you get back to civilization,' said Mason slowly, 'you go to the library and get William Beebe's book called "Beneath Tropic Seas." There's a picture of a triggerfish in there.'

'What does he do?'

'I'll explain it. This particular species of triggerfish is shaped something like a spray of eelgrass; that is, he'd look that way if he were head down on the bottom, with his tail waving in the water. So he takes advantage of that fact. He swims along over a clump of grass, turns head down, takes hold of something to hold on by, and furls his fins. Then he looks like one of the near-by shoots of eelgrass. He's colored green and gray, and these colors match to perfection.'

The boy thought of something else. 'Doesn't the flounder do a disguise act?'

'Oh, yes, and so do his relatives, such as the halibut, for instance. Want to hear about it?'

'If you've got time.'

Mason cleared his throat and began: 'The thing to remember about the flounder is that his body is made over, after birth, for the express purpose of camouflage. It's a very remarkable and very mysterious thing. When a flounder is hatched, he is the regular fish shape, and you'd think to look at him that he would develop into an ordinary-looking fish. As a youngster he has the approved shape of mouth, two eyes where they belong, and all the rest of it; but after he's been swimming around for a while, and acting like a sensible fish, he begins to show a tendency to roll over on one side.'

'Aha! Getting flat ideas, eh?'

'Precisely. And as soon as he gets the rolling fever and begins to lie on his side, the eyes show a very pronounced tendency to shift. Or rather the eye that normally would be on the under side starts to move around until it's on the top side, not far from the other. The optic nerves are so placed that this can be done.... His mouth also twists around, so as to fit in with his new position.'

'How long does that take?'

'Only a few days.'

'And he sinks to the bottom?'

'Yes; he begins to lie flat on the bottom. Of course, this flatness is the basis of his camouflage, but to help matters along he also colors himself to suit the bottom he's lying on. Then again he may bury himself in the sand or mud, all except his eyes. The eyes stick out — you've seen them — so that when his body is entirely out of sight the flounder can see what's going on. He may lie there without moving for a long time, waiting for his prey. I've seen crabs walk across a flounder, and the flounder never move.'

'That's more self-control than I'd have! Good gracious, though, that's marvelous when you come to think of it. The flounder must be the ocean's prize camouflager, isn't he?'

'No,' said Mason; and before the week was out, Ted himself had come to deny this honor to the flounder. Indeed, the poor flatfish ended up by seeming dull and even untalented beside the creature that finally won the title of Prize Disguise Artist!

This champion was discovered on the bottom of the sea, four fathoms down. Mason and his young assistant had descended to a kind of coral plateau, for the purpose of netting certain rare fish. The scientist set about the slow work of getting them used to his presence, leaving Ted to amuse himself as he saw fit.

The boy was absorbed in the search for new masters of the art of camouflage. And there were plenty of them to be seen. He saw fishes that shifted their colors the instant they changed their background; he saw a great basket starfish play trellis until an unlucky shrimp had ventured inside its multitude of arms; and then he became interested in a crab.

The crab was clever at hiding himself; indeed, it was only by accident that Ted discovered him. The boy had knelt down to watch a certain hump of sand. It seemed to him that some small creature lay hidden there, so he casually reached out for a mussel shell, intending to use it as a kind of shovel. To his surprise he had trouble in getting the shell. Something was holding it, and when he looked he saw a crab, gripping it with one of his front claws. The boy poked him, whereupon the crab started off, holding the shell in front of him, just as a hunter upon the Western plains used to hold up a tuft of grass in stalking buffalo.

Off went the crab, and before he had gone four feet Ted saw color shifting over his back. Camouflage and more camouflage! The creature was going the human hunter one better, for in addition to his shield he could also change the hue of his body. Mr. Crab was exchanging the sand plains for the shadows of a coral tree, and accordingly his blotches were readjusting themselves.

It occurred to Ted to take a crab up to the vessel and make some experiments on him. The chap with the mussel shell was out of sight, but there were others of his kind, and after he had helped Mason with the net, he caught a crab and took him up out of the water and into the motor-boat.

As soon as he was back on the Anemone, the boy asked Professor Bradley if he might use one of the aquariums for his crab. 'To experiment with,' he explained.

'Of course, of course,' said the scientist, pleased at this sign of scientific interest. 'Take that long narrow one. There's nothing in it except some rocks and old shells.'

Ted thanked him and at once installed his captive, fetching a little salt water to cover him. Then he manufactured two different types of environment, one in each end of the aquarium. In one end he placed light yellow rocks and light yellow seaweed; in the other he put rocks and seaweed of a dark brown shade; his idea being to see just how the crab would disguise himself in moving from one end of the aquarium to the other.

'But how will you make him move?' said the Professor, coming up.

'With food,' was the answer. 'I'll put a piece of fish in this end, and to-morrow I'll put fish in the other end, and leave this one bare. Then he'll move, in order to eat.'

'Good reasoning,' said the Professor, and walked away.

It was not only good reasoning, but it resulted in a discovery that fairly astonished the young experimenter. For no sooner did the crab find himself surrounded by dark brown seaweed than he took pieces of the stuff, put the ends of it in his mouth so as to get a sticky secretion onto it, and proceeded to fasten the bits of weed on his back, rubbing it into the spiny surface until it stuck! He was dressing himself to match his neighborhood!

Even more amazing was the crab's procedure when food was put in the other end of the aquarium. He shuffled after it, and having found himself surrounded by light yellow seaweed, he immediately tore off his dark brown disguise and replaced it with bits of yellow weed. It was apparently a case of new scenery, new costume!

Ted could hardly believe all this, and accordingly he kept it to himself until he had captured a second crab and placed it in with the first. Whereupon he stood gasping in surprise, for as soon as the two creatures came together, the newcomer set to work to pull the disguising seaweed off his neighbor's back, in order to start sticking it on himself! Then followed a comic war, in which the two crabs struggled for the same shreds of weed, one getting a piece fastened to his own back only to have his enemy jerk it off and start fastening it on himself!

'Well,' said Ted, when he had told Mason about it, and the scientist had approved the result of the experiment, 'I think we'd better give the crab the prize for being the world's best camouflager.'

'Second the motion,' said his companion; 'only you really haven't seen the best show that a crab can put on when it comes to camouflage.'

'What's that!' cried the boy. 'Are you trying to take away some of my glory?'

'Not at all, but what would you say if you were told that some crabs use a living animal for a disguising cloak or hat?'

'I'd say it sounded fishy!'

'Crabby would be better,' laughed the scientist, 'because it's absolutely true. Sometimes a young sponge floats down from the surface of the sea and lights on a crab's back and sticks there. After that they travel together. Or a crab will even plant a sponge on his back, and in order to keep it on, he will modify one pair of his legs, so that they will twist upward and develop pincers and hold the sponge in place.'

Ted's eyes grew wide.

'Anemones may be used in about the same way. A crab will catch an anemone and plant it on his back, and then stalk off after game with it. And I can tell you something stranger than that,' the scientist went on, enjoying the boy's astonishment. 'There are crabs that make slaves of anemones. In the Indian Ocean there is a little crab known as *Melia tesselata*, and on each of his front claws he carries an anemone. Probably he takes them on off some rock when they're small and plants them on himself, but anyhow he has them, and when he stalks his game he holds the little anemones out in front.'

'To hide himself?'

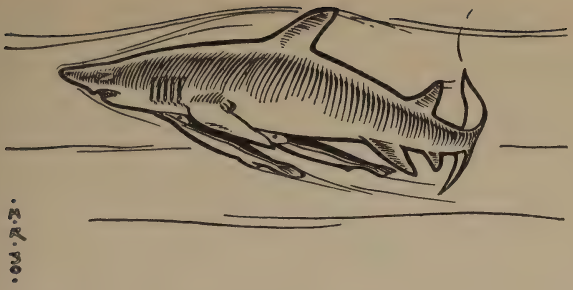
'Not so much that as to let them sting food for him. When the anemones brush against a small creature their barbed threads shoot out and paralyze it, then the crab grabs it and eats it.'

'That's nice of him!'

'Here's something else that same crab will do. When you alarm him, he'll sometimes hold up his pet anemones, just as if he wanted you to notice that he has two terrible slaves and you'd better watch out!'

'What if you take the anemones away from him?'

'If you do that he'll hunt for them,' said Mason. 'It worries him to be without them. One time, just to test the thing out, I removed the anemones from a crab's claws, cut them up, and put down the pieces near him. The instant he saw them he picked up the fragments and tried his best to piece them together again, so that he could stick them back on his claws. He wanted his slaves back.'



CHAPTER XVIII

STRANGE PARTNERS OF THE DEEP

ALL the rest of that day Ted Farnum puzzled his head over the crab that planted anemones on his claws. Such things did not seem possible. It was all so intelligent and so human that in the end he was forced to admit that Nature was certainly the wisest of planners and providers.

In spite of this conclusion, however, there was something about the crab-anemone combination that troubled him. And so it was that at the end of a hot tropical day, when the wind went down and cool, comfortable shadows came spreading over the schooner, the boy said to Mason; 'But how does it come that those slaves don't rebel or start a little revolution of their own?'

The scientist looked at him blankly. Their earlier conversation had passed out of his mind, so that he did not know what Ted meant until the boy explained.

'Oh, I see,' said Mason then. 'So you're still thinking about that, are you?'

'Yes; and I can't for the life of me see why the anemones would stand for such a thing. Even though they probably don't have much spunk, I should think they'd object to being slaves for a selfish old crab.'

'Why should they? It's a partnership.'

'A partnership? I don't see that.'

'Well, it is, just the same,' said Mason. 'Let's take one thing at a time. First, we'll look at it from the point of view of the crab. Naturally he gains from the arrangement, doesn't he? And he gains in several ways. For one thing the anemone is looked upon as one of the most unappetizing items on the entire marine menu, while the crab is considered very good eating. So if he has an anemone on his back or his claws, the crab stands a better chance of being passed up by a great many hungry enemies of his. Then again the anemone stings food for him, and that's a second gain.'

'Yes, I know,' said Ted. 'The crab gains, but what about the anemone? That's what I don't see.'

'Be patient and you *will* see it,' smiled his friend. 'Now we'll take up the anemone's case, and just for the sake of clearness, we'll suppose that our crab has a large anemone growing on his back. Very well; the crab travels a good deal, and this is an advantage to the anemone, because it brings him in contact with new sources of food. It's the old idea of travel or stay at home. In this instance the anemone puts a little extra emphasis on travel, and as he goes along with the crab he keeps stinging food and eating, meanwhile using the crab as a means of transportation.'

'But doesn't the crab take what the anemone kills?'

'Some of it, but not all of it. Many of the smaller creatures that the anemone stings he keeps for himself. And, besides, the anemone gets a share of the food that the crab kills.'

'How?'

'Simply by taking it. Of course it gets fragments — the crumbs, as you might say; but anyhow it's food.'

'But the anemone can't climb off the crab's back every time the crab kills something,' protested Ted.

'He doesn't have to. For example, there is an anemone which is rarely found anywhere but on the back of a hermit crab. What's more, this anemone is always seated on the shell in a definite position, with his mouth toward the front, quite close to the crab's jaws. The result is that the anemone can take morsels of food that escape the crab, without budging from the shell.'

'And the crab doesn't mind?'

'Apparently not. Why should he? The anemone helps him, and he ought to be willing to let the poor fellow have a few crumbs, now and then. It's the least he can do. Otherwise they wouldn't be partners. If you think the anemone doesn't profit from the arrangement, you should watch when the crab changes his shell.'

'I suppose the anemone changes with him.'

'You're right. When a hermit crab outgrows his shell and moves into a larger one, the anemone moves, too. He gets off, climbs onto the shell that his partner has picked out, and off they go again.'

'What if the crab should die?'

'That's hard luck for the anemone, but he doesn't necessarily give up the partnership idea. He waits and waits, and when it's pretty certain that his friend has played out for good, the anemone climbs off and parks himself on a rock until another crab comes along. If the traffic isn't very thick around there, the anemone may never get another ride, but if he's patient and waits long enough, along will come a crab; then they set up as partners. Of course, I don't mean that they sign papers or anything like that, but in a kind of unconscious way they seem to agree to agree, and off they go together. There's sometimes a third partner to that arrangement.'

'You mean two anemones on one crab?'

'That happens, yes. But I meant a different animal. A hermit crab, you know, is often found in a large whelk shell. The crab uses only the roomier parts of this shell — the large spirals near the opening, I mean — and in the small upper twists of the shell there may be a certain worm; he travels with the crab and the anemone, and when his pals have killed something, he comes out for his share.'

'*His* share! What does he do to deserve a share? I don't call that being a partner, I call it ——'

'Wait a minute. I'm not through. The worm eats what the other two kill or catch or find, but in turn the worm acts as a scavenger and keeps the shell clean. He's the housekeeper.'

'Oh!' said the boy.

This last story was too much for him, and he rather put the idea of partnership out of mind until two days later, at which time it was brought back to him under very peculiar circumstances. He was on the bottom with Mason, and while the scientist sat and sketched corals Ted walked slowly about on his own behalf. Somehow his life-line seemed too short, and he was looking up toward the surface, about to signal Joe for more line, when he caught sight of the long, straggling tentacles of a jellyfish.

Ted had seen many jellyfish, but never before had he seen one like this. It was of the variety known popularly as the Portuguese man-of-war, a beautifully tinted pink and blue mass that went floating along the surface, while its long dark-violet tentacles trailed down and out through the water for a distance of more than thirty feet. The boy moved out of the way of these streamers, yet he kept looking up and watching. For he could see four or five small fish that persisted in swimming in and out among the sting-laden tentacles, and he was wondering what this meant.

'It might be a case of partnership,' he said to himself.

No sooner had he said this than the little fish seemed to decide to give him a demonstration. They swam out from the neighborhood of the jellyfish's streamers, and immediately a larger fish saw them and started in pursuit, whereupon the little fellows dashed back to the protection of the tentacles, as if they knew that their enemy would give these long trailing things a wide berth. And the big fish did keep away, although unfortunately one of the little fellows accidentally brushed against a tentacle and was instantly pierced and seized by its multitude of stinging barbs.

'So then I didn't know what to think,' Ted told Mason, that evening. 'At first I thought the Portuguese man-of-war and the little chaps were partners, and the fish were trying to get the big fellow to come close enough to get stung, so that the jellyfish and the decoys could all have a square meal. But when I saw that little fish get in trouble with a tentacle, I changed my mind, and now I don't know what to think.'

'Then you're in good company,' smiled the scientist, 'because there are a great many famous biologists that are in doubt about this very question. Some think it's a case of partnership, and some deny it.'

'What do *you* think?' asked the boy.

Mason shook his head. 'I don't care to say — just at this time. But I'll say this, Ted, when you get as far down the scale of life as a jellyfish, such arrangements as partnerships are purely mechanical and automatic. Therefore, the fact that your little fish was stung to death doesn't prove that he *wasn't* in partnership with the jellyfish. Speaking of partnership,' continued the scientist presently, 'did you know that barnacles and corals often live together? The barnacles dig into the substance of the coral until they're so deep that all you can see is a tiny hole. That hole is for the barnacle's feet to stick out through when he wants food.'

'But I don't see any partnership to that. The coral doesn't get anything out of it.'

'Oh, yes, it does. Listen. Both the barnacle and the coral live on small organisms that float in the water, and naturally they're both interested in having food come to them. The barnacle's contribution is to wave his legs as hard as he can and set up a tiny current of water toward himself and the coral. If there are a great many barnacles in the coral, the result is a considerable flow of water; then as the food particles come up, the coral polyps send out their stingers and the barnacles stick out their legs, and they call it meal-time!'

'That's better,' said the boy. 'But even so I should think the barnacles would hurt the corals, boring into them like that.'

'It doesn't seem to, though. These particular barnacles aren't parasites — they live on what they get out of the water. At any rate, that's the way the evidence points.'

Ted went to bed with a tingling brain that night. He was thinking out the possibilities of partnership among the creatures of the deep, just as he had previously explored the idea of camouflage. But success had rather spoiled him; or, to be more accurate, it had made him dissatisfied with modest achievements. Crabs and anemones, corals and barnacles, and possibly the Portuguese man-of-war and certain small fish — none of these combinations seemed to him to be a *real* partnership. Of course these arrangements were wonderfully interesting, and clever, and all that, but at the same time they were lacking in — well, they were lacking in mutual intelligence. In every case the agreement was either an automatic, unthinking affair, or else the mental awareness was chiefly on one side. And what Ted wanted was a case of partnership in which both parties were intelligent enough to give the impression that they were actually aware of what they were doing. In other words, he was trying to figure out a partnership between such relatively intelligent sea dwellers as fishes.

He did not figure this out at once; indeed, a week went by without his discovering even a clue. When he was down on the sea floor with Mason, he saw tiny fish following big fish for the sake of eating the crumbs they left; he saw little fish stay close to their great neighbors for the sake of protection from their own special enemies; and he saw various species of fish that seemed to be traveling about together; yet he found nothing that appeared to be a real partnership.

Then one Sunday, as he lounged about the schooner with Mason, an idea struck him. He thought it over for a few moments, and presently said to his friend, 'You know, I've just been thinking about sharks.'

Mason gave him a quizzical look. 'Not worrying about that big gray fellow coming back, are you?'

'No. But do you remember the fellow that we caught when we were coming down here from Baltimore, with a little fish swimming alongside him?'

'Yes.'

'Well, what do they call that little one?'

'He's called the pilot fish.'

'That's it!' exclaimed Ted. 'I've been trying to think of that name for ten minutes. You know, Mr. Mason, I remember that you told me what that little fish's name was before we hooked the shark, but I didn't know enough to pay attention then. But now I do, and I'm wondering if the shark and that little pilot fish weren't partners. Am I right?' asked the boy.

'Dead right,' said Mason, smiling all at once. 'Ted, I'm proud of you, because you're thinking clearly and you're thinking logically.'

The boy flushed at the warmth of this praise.

'Sometimes a shark has several pilots,' continued the scientist, by way of helping him over his embarrassment, 'sometimes only one.'

'The shark we caught had only one, didn't he?'

'That's all, if I remember correctly.'

'And these two partners share their food?'

'Yes. The shark gets most of it, of course; but that's all right, he's larger than his partner and so he needs more. The little fellow doesn't mind; he gets enough. If you ever see those two feeding, you'll notice that the pilot always slips up and takes his share, by way of pay.'

'Pay for what? That's what I can't figure out.'

'Pay for his services. Oh, he helps the shark; otherwise the big fellow would gobble him up, rest assured of that. Didn't you notice that little pilot dart back and forth between the shark and our salt pork when we let down the bait?'

'Yes.'

'Well, the pilot was collecting information for his big pal. A pilot is just what his name implies. He leads the shark around, or guides him to where there is a possible chance to get something to eat.'

'I'd like to know how he does it,' said Ted.

'It's a gift,' smiled the other, 'and that's about all we can say. But we do know that a pilot fish will often dash off into the open sea, with the shark tagging along behind, and go for a mile or more, straight to a ship, or to something else that holds a promise of food. After that, it's up to the big fellow.'

For a moment the boy was silent. He was recalling what had taken place in the water just before he shouted to Mason that the shark had taken their bait. 'Now I remember,' he said slowly. 'That pilot was terribly afraid that his partner was going to make a mistake in grabbing our chunk of pork. He was suspicious of it; that's why he got so excited.'

'Probably. Sometimes when things look dangerous, a pilot will dash around so frantically that you'd swear he was the shark's guardian.... And here's another very curious task that the pilot fish performs. When the shark has young ones, and they're swimming about in the water, the pilot keeps an eye on them, just like a nursemaid. If an enemy comes too close, the pilot herds the little ones up to the front end of the shark, and the shark opens her mouth and swallows them until the danger is over.'

'Leaving the pilot outside!'

'Oh, no, the pilot goes in, too. Only he waits until the last, like a maid that wants to make sure that all her little charges are safe, before she thinks of herself.'

Ted looked queer. 'If I read that in a book,' said he, 'I wouldn't believe it.'

'Truth is stranger than fiction,' observed Mason dryly.

'Now here's another question,' said the boy, 'provided you're not tired of answering them.'

'I'm never tired of answering sensible questions,' was the retort. 'What's on your mind?'

'Not very much, I'm afraid, but I was just wondering who this pilot is. Where did he come from, and where did he get the idea of bossing a big shark around? And what does the pilot do if his partner dies, or gets caught, like the one we baited with our salt pork?'

Mason held up his hands in mock despair. 'Help!' he cried. 'You say you haven't very much on your mind, and then you turn loose with a whole string of questions. And *such* questions! If I could give a satisfactory answer to all of them, I'd write a book on the pilot fish and establish my reputation as a scientist!'

'I'm sorry,' said the boy, with a sheepish grin. 'I didn't mean to ask so many.'

'Well, let's see what we can do with them,' chuckled his friend. 'Only, if you don't mind, I'll take one question at a time. Let's tackle the last one first, about the future of the pilot fish when his partner goes the way of all flesh. Was that it?'

'Yes.'

'All right. At first the little pilot goes into a frenzy. He dashes back and forth, and fusses and grieves, and maybe sheds a few watery tears — figuratively speaking, of course — and if the shark has been caught by some one aboard a vessel, he'll follow it for days, as if he were waiting for his big friend to come back down and swim off with him. In the end, however, he resigns himself and goes off to find another partner. That's his profession, you know — being pilot to a shark.'

'Then ——'

'As to who the pilot is, you'll have to be content with the fact that he's a member of the mackerel family. Aside from that I can't tell you anything about his origin.'

'I hope you can tell me how he learned his trade, though.'

'No, I can't even do that,' said Mason slowly. 'The pilot fish is the result of an ancient and mysterious development, but just how he became adapted to be what he is, we don't know. When scientists attempt to pry into puzzles like that, they come bang up against a wall. It's just another of Nature's secrets.'

CHAPTER XIX

THE SUBMARINE BEAUTY SPECIALIST

Mason had said that the shark's pilot was one of Nature's secrets, and probably he expected that this would close the discussion.

Nevertheless, Ted could not forget the little fish. He wanted to know more, and with this in mind he began to put in his spare time in the office, ransacking the books which Professor Bradley had brought along. Most of these volumes, however, were too technical for him; indeed, the majority of them referred to fishes only by their scientific names. All in all his search yielded him nothing, until by chance he discovered a copy of the 'National Geographic Magazine,' containing a picture of a shark and several little fish attendants.

The trouble was that these small fish did not fit in with the boy's idea of the pilot. It was true that they were small, but on top of their heads was a curious flat disc, and the meager description under the picture said that these fish were shark suckers, their scientific name being *Echeneis*.

Ted puzzled over the problem all that day, and at evening he went to Mason and asked him if he wouldn't explain it.

'Well, I don't blame you for being confused,' said the scientist. 'Most people are, when it comes to this question of shark suckers and pilot fish.'

He paused for a moment, as if to plan how best to explain the matter, and then he went on, very slowly and carefully:

'I'll see if I can clear it up, so that you'll never be confused again by these particular fish.... First of all, let's make sure of the pilot. As we said before, there is a fish which is known as a shark's pilot. This fish belongs to the mackerel family. It accompanies the shark, but it always swims by itself, either in front of or beside the shark. The top of its head is perfectly normal.'

'No disc?'

'Never,' said Mason firmly. 'All right; let's leave the pilot and turn to a certain group of small fishes which are often confused with the shark's pilot. This group is made up of a number of related species, variously referred to as shark suckers, shipholders, or remoras, but for the sake of simplicity we will refer to them all as remoras. Now, then, the remora is a small fish, of the same general size as the pilot fish, but it is an entirely different creature. The remora is a genus of unknown ancestry, and apparently it has no relatives now living. Their great peculiarity is, of course, their disc.'

'The disc is on top of the head, isn't it?'

'Yes, and it is a means of holding on to things. The outstanding feature of the remora is that it attaches itself to ships, whales, sharks, tarpon, sailfish, and other moving objects. Different species of remora prefer different types of free ride, but they all hook on to something, instead of relying chiefly upon their own fins.... I wonder if that's clear? The pilot swims by himself, has no disc, and is a genuine partner of the shark. The remora includes a variety of disc-headed fish that cling to different moving objects by means of a special disc on the top of the head. The two are absolutely distinct. Do I make that plain?'

'Yes,' said Ted quickly, 'and thank you for untangling it. I didn't know where I was when I ran up against that disc... That must be a peculiar thing. Can a remora get a pretty good grip with it?'

'You'd think so if you tried to pull one loose!'

'That disc must be a kind of suction pump,' observed Ted.

'That's just what it is.' The scientist nodded. 'And in addition it has two special devices. One is a series of transverse ridges which act as cleats and keep the remora from slipping too much, and the other is an army of small spines which project backward, like so many tiny fish-hooks, so that when the remora attaches itself, these spines pull back into the skin of the shark, or whale, or whatever it is, and help in that way. The disc itself is on the top of the remora's head, and is rather oval in shape. Of course the creature's head is flat on top, so that the disc can take hold effectively.'

'Looks like some more of Old Dame Nature's work.'

'Right,' said Mason.

'But,' Ted went on presently, 'I should think that the fish that the remora hangs on to would object. I know I should.'

'They do object — that is, they object when they're young and it's first tried on them. I've never observed this myself, but I've been told that when a remora first attaches itself to a rather small fish — for instance, a young tarpon — the fish will try to get rid of it, either by scraping against rocks or by turning and rolling on the bottom. But it's no use, because, even if the remora lets go to keep from being bruised, it'll jump on again in an instant. They flash through the water like a shot out of a gun. I've seen them over around Haiti when they were apparently dashing off to meet a shark — and talk about speed!'

'Did you ever try to pull one loose after he'd attached himself to a fish?'

'Just once,' said Mason grimly. 'We tied a rope through his gills, and then three of us started to pull. Well, we pulled and we pulled and we pulled, but he hung on like death, and when we did get him loose he'd left his sucking disc behind. It's tremendous, the strength they have in that thing. Why, a remora weighing a pound and a half can be used to haul in a turtle weighing over sixty pounds. It's been proved.'

The boy was chuckling. 'That's a queer experiment for science to make!'

'Science didn't make it,' was the retort. 'That happened in the ordinary course of fishing.'

'What do you mean?'

'Why, I mean that the remora was used as a fish-hook.'

'Fish-hook!'

'Certainly. Over on the coast of Africa the natives will take a remora, tie a cord around his tail, go out in a boat, and when they see a turtle they throw the remora overboard. The remora darts off through the water, attaches himself to the turtle, then the natives haul in on the rope, with the remora and the turtle on the end of it. That evening they have turtle soup!'

'Whew! That *does* sound like a fish story!'

'Yes,' said Mason, 'that's just what it is — a fish story, only this one is true. The primitive Australians used to do the same thing, they say.'

Ted was still a little suspicious. 'Did any white man ever do that with a remora?'

'One tried it, that I know of.'

'A civilized white man?'

'Yes, and a scientist to boot. It was Professor Longley, the man who pioneered the way in submarine color photography. He never really had a chance to see what the remora could do, though, because the rascal persisted in attaching itself to the boat every time he threw it overboard and wanted it to go after a fish.'

The boy heaved a great sigh. 'Well, all I can say,' he murmured, 'is that I never hope to see anything that will strain my imagination as much as that!'

'Bosh!' cried the scientist, laughing heartily. 'Do you really want to see something that will make you dizzy?'

'What is it?'

'Something that will make every unscientific friend you've got think you've made it up? Would you like to see such a thing?'

'Why — yes — sure, I should,' said the puzzled boy.

'Then,' was Mason's rejoinder, 'I want you to row out to the motor-boat to-morrow morning, as soon as you're through helping the Professor, get into your diving helmet and come down where I'm working. I want you to see my submarine beauty parlor.'

There was not a word from Ted. Now he *was* sure that his friend was making fun of him!

'I call it the beauty parlor,' continued the scientist, 'although as a matter of fact it's a combination beauty parlor, surgical clinic, and dentist's office. But on account of the gorgeous surroundings, and the lovely gayly dressed clients, I prefer to call it a beauty parlor.'

'Who are these clients?' demanded Ted cautiously.

'Fish.'

'And who — er — works on them?'

'Other fish.'

'Huh,' said the incredulous boy. 'I suppose those clients get their teeth pulled down there!'

'Do you have your teeth pulled every time you go to a dentist?' was the retort.

'No, of course not. But I have them attended to.'

'Well,' said Mason soberly, 'that's just what those fish clients do. They go to the beauty parlor to be freshened up and to be made presentable, and in the course of this they have their teeth attended to.'

Ted's eyes sharpened. It seemed to him that Mason was sticking to his story for a strangely long time. 'Then tell me,' he said, at last, 'just what do your beauty specialists do to these clients?'

'They remove their parasites and give their customers a general cleaning.'

'That's news to me,' declared the boy, 'because I understood that fish didn't have parasites.'

'Where'd you get that idea? A poor fish may have dozens of different kinds of parasites.'

'Internally, yes, but I mean parasites on the outside. I've read somewhere that fish don't have any, because their skin is so slippery.'

Mason objected to this. 'Ted,' said he, 'that's only part of the story. It's true that a bird has feathers and a land animal has hair or fur, and it's also true that these types of covering are much more encouraging to parasites than is the smooth skin of a fish. Moreover, our fish manufactures a certain slime, which keeps passing over the outside of its body for the purpose of removing the multitude of small creatures that may be trying to fasten upon it.'

'And now,' said Ted smilingly, 'you're going to say that in spite of this the fish does have external parasites!'

'Yes, I am. Fish may have fewer than land animals, but they do have some parasites, and that's why there is such a thing as a submarine parasite picker — or, to use a prettier phrase, a submarine beauty specialist.'

A wide grin spread over Ted's face. 'Nature is too much for me,' he chuckled. 'I haven't another word to say, except that if there *is* such a place, around here close, I'd certainly like to see it.'

'That'll be easy,' said Mason. 'I'm going down early, and if you'll come down when you can, and stand near that big elkhorn coral where I park my folding chair you'll see what I mean.'

Ted promised to come just as soon as he was at leisure, and he kept his word. He had to help Professor Bradley for a while the next morning, but the instant he was dismissed, he hurried into the rowboat and went jerking across the water to Joe and the motor-boat.

'My gracious!' said the colored man, laughing as usual, 'yo' sho' is in a hurry. Yo' got a date down dere in de watah, huh?'

'Yes, I have,' answered the boy, as he climbed aboard. 'I've got an appointment with a beauty specialist. Help me get the lines straightened out. I'm anxious to get down.'

Joe came to help him. The air-hose was coupled up, the second cylinder of the pump began to push air into the helmet, and in another minute the boy was up to his neck in water, with his helmet in place. Then down the ladder he stepped, occasionally swallowing to keep his Eustachian tubes open. Reaching the bottom, he slowly oriented himself, located Mason, and set out for him.

The scientist raised a hand as a sign that he knew Ted was there, after which he silently returned to his own observations. Meanwhile Ted had spied out the antler coral which was supposed to mark the general position of the submarine beauty parlor. He placed himself near this coral, sat down on the bottom, and prepared to watch.

'Ah!' he said presently, and told himself that the beauty parlor had opened for business. A big parrot-fish had appeared. It swam slowly up to a coral tree, took hold of a small 'twig' with its mouth, pushed back with its pectoral fins, and wrenched off a bit of coral. This accomplished, the big fish proceeded to place itself in a vertical position, head up and tail down. The creature remained in this attitude for some little time, apparently engaged in swallowing the coral it had pulled off.

But what interested Ted most was this: A half-dozen little fish called wrasse had followed the parrot-fish to the coral, and as soon as the big fellow had upended himself, these little fish darted to his mouth and appeared to lick his lips. The parrot-fish paid no attention, but merely went on swallowing the coral, and when he had finished, he came to a horizontal position and moved off, the wrasse tagging along behind.

To tell the truth, Ted Farnum was disappointed in this performance, for though it was interesting it certainly fell short of his expectations, as he told Mason that evening. 'So I don't think much of your beauty parlor,' he concluded.

The scientist gave him a tantalizing smile. 'Why judge it until you've seen it in operation?'

'Why, I did see it, didn't I?' demanded the boy.

'Not according to what you've reported.'

'But that big parrot-fish ——'

'Pooh, that wasn't what I meant. That fellow was simply eating, and those little wrasse were picking up the crumbs. Of course you were disappointed if you thought that was my prize show.'

'Well, I stood right by that antler coral and that's all I saw,' cried Ted. 'How do you explain it?'

Mason wrinkled his brows. 'Now that I think of it,' he answered, 'I imagine you were a little late. I've noticed this parasite-picking going on about ten o'clock, or between ten and ten-thirty, and you didn't get down to-day until nearly eleven.'

'Oh, shucks,' said the boy, overcome with disgust.

'Never mind, I'll tell you what I'll do,' said the scientist. 'I'll ask Professor Bradley if you can't come down a little earlier; then you'll be on time for the show.'

Next morning he was taking dictation from the Professor. Thanks to Mason's request he was excused at nine-thirty, and by five minutes of ten he was climbing into the motor-boat and calling upon Joe to help him get ready to descend.

'Is yo' got anudder date?' chuckled the darky.

'I sure have, Joe. Of course it's not a stylish one, or it wouldn't be this early in the morning, but it's important, so let's get started.'

The pump began to shoot air into his helmet, and in record time he was on his way down the ladder. On reaching bottom, he went immediately to the great antler coral and sat down on the sand at the foot of it, thinking to himself how much it resembled the deer horns which are so often used in clubhouses by way of hatracks. Nor was this the only thing which made the spot look like a public gathering-place, for off to one side there was a huge coral fan which waved gently to and fro in the water, as if it were cooling the place for the clients to come!

And now the beauty specialists themselves appeared. They were of a species known to science as *Chætodon ocellatus*, to the layman as butterfly fish, and to Ted as pretty little chubby things which were almost round when viewed from the side. There were five of them, and as they swam into the open space before the antler coral, he saw that each one of them was marked by a bold black stripe running down the side of the head and serving as a kind of badge or uniform.

A moment later the first of their clients appeared. He was a great heavy fish called a grouper. Straight up to the tiny little butterfly fish he came, and opened his mouth. Instantly they dashed toward him, one of them cleaning his gills, another his eyes, and the others actually swimming into his mouth, where they went from one tooth to the next, freeing him of various troublesome parasites. Curiously enough, this mouth work seemed to tickle him, for he kept wriggling and drifting about in the water, until it was necessary for him to jerk himself together and swim back into position.

While all this was going on, a second grouper appeared. He came up quietly and sank down upon the sandy bottom, like a well-trained customer who sees that he must wait his turn.

'That's setting a good example,' said Ted to himself, but scarcely had he spoken when up swam a pair of fish which are known as grunts, because of the peculiar sound they make. These newcomers must have seen that the butterfly fish were busy with a grouper, and they must have seen that a second grouper was waiting to be served, yet they apparently had no intention of waiting their turn. They seemed to grunt and grunt, as if demanding attention, and when the butterfly fish paid no attention, up swam the intruders, by way of telling the grouper that he had been monopolizing things long enough. Whereupon the big fellow turned on them and chased them away, and then returned to his five little helpers to be worked on again.

When the first grouper was finished, he turned and swam off. Now the two grunts dashed up, only to be chased off by the second grouper. It was obvious that he knew his turn, and it was very clear that he meant to take it, no matter what a pair of ill-mannered grunts might think!

Then Ted noticed that he himself was not the only spectator in this strange place of business. An odd-shaped little seahorse had come up, and was standing on his tail in the water, looking on with his great goggling eyes. He seemed to be playing the rôle of barber-shop lounger, and the strangest part of it was that he was accompanied by a smaller companion, a tiny seapony who gave the impression of having come here to learn from his parent how best to see the sights of the fanciful world that lies under the waves.

For more than half an hour Ted watched the butterfly fish perform their amazing task, more and more astonished that such things could be. And the more he watched the more he was filled with enthusiasm, so that when he was back at the surface again, and able to talk to Mason, he fairly exploded.

'I saw it!' he cried. 'I saw it! And I'd give anything if I could go down to-morrow and see it again! Do you suppose I can?'

'Perhaps,' said Mason, smiling quietly, 'although there's no telling how long it'll be there.'

'Why not? Will the place close down?'

'Yes. It's a regular meeting-place, but after the groupers get through schooling around here, the little chaps will go off.'

'They set up a regular shop, don't they?' exclaimed the excited boy. 'Only they don't get paid.'

'Of course they do,' said Mason.

'They do? How?'

'Figure it out for yourself,' laughed the scientist, and would say no more.

CHAPTER XX

FINNY ROGUES AND 'STAR BOARDERS'

'To-day,' said Mason, as the great tropical sun burst into their sleeping-tent the next morning — 'to-day we gather sponges.'

Ted dressed in silence. He was thinking of the task ahead. So far into the summer each day had been different, for although the things he did for the Professor were always of the same general type, there was always some fascinating phenomenon to observe, or at least an interesting idea to follow out. Yet on this particular morning the boy had his doubts. The day before had yielded the exciting spectacle of the parasite-pickers, and in contrast with that the work of pulling sponges would doubtless be dull, and even uninteresting.

'I want to show you something before we start,' said Mason, and after breakfast he led the way to the office.

The boy followed, waiting in silence while his friend hunted about in a pile of cardboard charts. Finally Mason found what he wanted. It was a sketch, representing the fore parts of a crab, except that in place of a shell he seemed to be surrounded by a kind of muff.

'Looks like a crab inside a doughnut,' observed Ted.

'That doughnut is a sponge,' said the scientist.

'Oh, is it! I didn't know a sponge would grow around a crab like that.'

'Generally they don't, but this is an exceptional case. I just wanted you to see how a sponge could be made to serve as a free lodging-place. In the beginning, Ted, this sponge came floating down from the surface and settled on the back of a hermit crab. The sponge grew and grew, until at last it surrounded the hermit's shell. Gradually the sponge absorbed the shell, and after that the crab used the sponge for a shelter. This particular sketch was made by Professor Bradley off the Irish Coast about seven years ago.'

The boy looked disappointed. 'Then I shan't see anything like that down here.'

'Don't worry,' was the smiling answer. 'You'll see something like it, only more exciting. That's why I thought I'd show you this — as a kind of introduction. Now let's go. We've got some hard work ahead of us.'

They got their diving equipment and with Captain Nordstrom to mind the pump they set off in the motorboat. Their destination was a shallow spot about three quarters of a mile north of the Anemone, an area so rich in sponges that when they gazed down into the clear water they could see the dark bulky things as thick as boulders in a New England pasture.

'This'll be easy,' said Ted to himself, but alas! for his optimism, he was to learn that it takes a great deal of hard work to get a big sponge off the sea floor and into a boat. For one thing these queer animal growths were larger than they appeared to be from the surface, and for another thing they were firmly rooted to the bottom. And so it was not until Mason had gone down and hacked them loose that they could even budge them with the ropes that they had brought along. Moreover, the scientist himself had to climb back up to the boat, take off his helmet, and help the Captain and Ted pull.

'It's heavy, all right,' said the boy, as the three of them hauled away at their first specimen.

'Heavy!' said Mason. 'You'll think so when it comes to the surface. The water's buoying it, so far.... Now, then, here it comes.'

It turned out as the scientist had predicted. The sponge rose to the surface as a heavy unwieldy mass that steadfastly refused to be lifted any farther. In the end they had to tie the rope and wait for some of the surplus water to drain out of the thing, in order to hoist it into the boat.

'One,' Mason counted. 'We'll get four or five smaller ones now.'

Again and again he went down, cutting each sponge loose from its base, tying a rope about it, and signaling his two assistants to haul away. By eleven o'clock they had the motor-boat piled high with dripping sponges, dark fleshy things that gave off a distinctly unpleasant odor.

'That's enough for to-day,' said Mason, and back to the Anemone they went.

Here the hoisting process had to be repeated, but this time they had Joe to help. One after another the sponges went bumping up and up to the deck of the schooner; then they were hauled into the laboratory and placed in large zinc tanks.

By this time dinner was ready, and they stopped to clean up. At the table Professor Bradley asked a few questions about their specimens, but in the afternoon he went back to his steel chamber, leaving Mason and the boy to return to the laboratory.

Ted measured the biggest sponge with his eye. 'I'll bet a nickel,' said he, 'that it weighs a hundred and forty pounds if it weighs...'

He paused to stare at the big dark thing.

'Now what?' said Mason, putting on a rubber apron.

'Why,' said the boy in surprise, 'I thought I saw a fish stick his head out of that sponge!'

'Probably you did,' and the scientist rolled up his sleeves. 'Now, then, let's get ready for business. I'm going to take this big butcher knife and cut up one of these sponges. I'll cut off a chunk at a time and shake whatever is in it into that empty tank right beside you. All right; you find a pencil and some paper and make notes on what we find.'

Mason picked up his knife and gashed into the sponge.

'It's hard to believe that thing's an animal,' observed Ted, holding his pencil and paper ready.

'Why?'

'Because it doesn't pay the slightest bit of attention when you cut it.'

'That's natural. The sponge is so far down in the scale of life that ——'

'For goodness' sake!' cried the boy, 'what's that noise? It sounds like a bunch of firecrackers going off inside that sponge!'

'It's an indignation meeting,' chuckled his companion, and went on slashing at the sponge. 'The star boarders are annoyed to think we're disturbing them! See, there's one of them sticking his head out — now he's gone back in, probably to tell the others that we mean business.'

'But that wasn't what I saw,' said the puzzled boy. 'That was a shrimp, and I saw a fish.'

'Oh, well,' said Mason, studying the sponge to see where it was best to cut, 'there are different kinds of boarders in here. Look!'

At that moment two small fish tumbled out of the sponge, followed by a crab. Ted seized them and placed them in the tank, after which he marked them down on his pad. Meanwhile, the scientist was cutting off another slice, indifferent to the chorus of tiny clicks from the inside of the sponge. Now and then they caught sight of a pale little shrimp, but always he scurried back into the recesses of his house of many tunnels, as if trying to believe that somehow and somewhere he would find safety.

'See this,' said Mason, picking a jagged flinty little object out of the fleshy part of the sponge.

'Yes, I've been noticing those. What are they?'

'They're the framework of the sponge house,' was the answer. 'They help hold up the soft parts, just as beams and rafters help to support one of our houses.'

'Then the sponge *is* a house,' observed Ted thoughtfully.

'A lodging-house,' added the scientist, 'and here comes one of its chief tenants!'

It was a tiny shrimp, one of the pale, ghostly creatures that they had caught a glimpse of before. Undoubtedly he was also one of the members of the clicking chorus, for no sooner did he tumble into the tank than he fell to snapping his great claw with the noisy persistence of a small boy who is trying to attract the teacher's attention in school.

'Why, he's got only one claw!' exclaimed Ted, examining the little thing. 'No, there's a second claw, but it's not nearly as large.'

'Here's another shrimp,' said Mason, 'and two more. Some of them are left-handed and some are right-handed, do you see?'

Ted got the newcomers into the tank. They were all very small, none of them being over two thirds of an inch in length. But now that there were four of them, they seemed to consider themselves a satisfactory quartet, for they immediately began to snap and click their big claws.

'We have with us to-day,' chuckled the scientist, 'four members of *Alpheus saulcyi*, otherwise known to fame as the snapping shrimps. If these rascals had been living out in the world by themselves, they would be brown and green in color, but being tucked away inside this sponge they've paled down to a dirty white, like potato sprouts in a cellar.'

Here the chorus within the sponge rose to a frenzied pitch. The cruel knife had slashed away most of their boarding-house, and now the little shrimps that had retreated and retreated were finding themselves face to face with eviction. Mason shook five of them out of a single slice of sponge, three out of another, and nine out of a third. So it went to the bitter end, until the sponge had been reduced to small chunks and every last inhabitant was in the tank. Ted examined his list and announced that they had captured one crab, two fish, and thirty-four snapping shrimps.

'Thirty-seven lodgers,' said Mason, putting down his knife.

'And none of them paying rent, I suppose.'

'Not a one. This is purely a case of getting something for nothing. All these creatures use the sponge as an apartment house, but they make absolutely no contribution in return.'

Ted smiled down at the angry little shrimps, vastly amused to see each one lift up his great claw and snap it time after time. They seemed actually to be threatening him.

'Not a cent of rent,' he murmured, 'but to look at these fellows you'd think they owned that sponge!'

The scientist bent over the tank, studying the tiny creatures.

'Well,' continued the boy, 'I'm glad these shrimps are taking it so hard.'

'Why do you say that?'

'Because that partnership idea we were talking about yesterday sounded too honest and noble for a bunch of animals like crabs and fish!'

Mason laughed and poked a little shrimp with his finger, whereupon it burst forth in a perfect fury of clicking.

'They're all bark and no bite,' said Ted, but a few moments later there was a terrible commotion in the tank, and he saw how much he had underrated the powers of the shrimps. One had suddenly left off snapping to tear off the claw of his nearest neighbor. This acted as a signal for a free fight, and before they could be separated, the thirty-four ferocious little monsters had pretty well torn one another to pieces. A dozen legs were strewn about the tank, two great claws were forever lost to their owners, and five or six other individuals had retired to the corners, to nurse their wounds and sullenly click their claws.

'I forgot what cannibals they are,' said Mason, as he hurriedly got them into separate jars. 'Heavens, what a battle-field!'

The scientist wiped his hands on a towel and suggested that they go outside for a breath of fresh air. 'I don't like the smell of those sponges,' he remarked, 'and we've got several more of them to cut up.'

By way of recess, therefore, they went for a stroll on the deck, looking out over the blue sea and chatting.

'Talk about shrimps being star boarders,' said Mason presently, 'sometimes the case is reversed, so that instead of getting the long end of the stick they get the short end of it.'

'How could that be? A sponge couldn't do anything with a shrimp.'

'I don't mean that combination. I mean shrimps and fish. Do you remember telling me about the house-building shrimps down on the sea floor? The ones you saw building a burrow.'

'Oh, yes.'

'Well, I don't suppose you noticed any small fish around that burrow, did you?'

'Why, yes, I did, but I never thought anything of it.'

'Those fish,' said the scientist, 'were probably living with the shrimps. Sometimes there are as many as three fish in one shrimp den. They live in there, and take advantage of the shelter, and say nothing more about it.'

'I should think the shrimps would say something about it!'

'They don't, though. If the fish get in the way, a shrimp will push them out of the way and go on, in or out, as the case may be, but apparently that's the end of it.'

Ted was laughing. 'A house for nothing, and no objection from the landlord. I call that pretty easy.'

'That's not the only instance of a fish that gets a house for nothing,' Mason went on. 'Over on the coast of Australia there's a certain species of perch that uses a sea anemone that way.'

'Goes inside it, you mean?'

'Yes. The anemone will ordinarily sting fish, but apparently it will open its mouth and let this particular perch come in and take advantage of the shelter, and without charge, at that. And there's another little fish that uses the sea-cucumber for a house.'

'I don't think I know what a sea-cucumber is,' said Ted.

'It's best described as a degenerate sea-urchin,' the scientist explained, 'and it's hollow enough to serve as a hiding-place for this particular fish. So he stays in there and darts out after his prey, when there's any prey going by.'

'Another fish that gets his own way!'

'I don't know about that,' objected Mason. 'Sometimes this same little fish tries lodging with a pearl oyster, and then he doesn't fare so well. In fact the oyster may kill him.'

'Aha!'

'We don't know just how it's done, though. Personally I think that the oyster catches the fish off guard and closes up on him, then he keeps his shell closed tight until the fish smothers. But at any rate, the oyster knows how to finish him, if he really wants to.'

'I should think that sort of business would teach fish to keep away from oysters,' said Ted, smiling.

'Except that other oysters aren't so hard-hearted,' continued the scientist. 'For example, right down here in the West Indies there is a small fish that lives in what's known as the Spanish oyster, and in perfect safety, too. The Spanish oyster isn't like our Northern variety; it's long and thin and wedge-shaped, and normally the pointed end sticks in the bottom and the larger end sticks up into the water. Well, the oyster itself uses only the lower end of the shell, and so this fish has learned that he might as well occupy the upper floor, as you might say.'

'Think of using an oyster for a house,' said the boy. 'It is a wonder something doesn't have the nerve to pry into a barnacle's shell and use that for a free apartment!'

'Nothing does that, as long as the barnacle is alive,' was the response, 'but I'll tell you what does happen. There are certain tiny fish that prowl around the hull of a ship until they find a large empty barnacle shell, and then they get into it and use it for a private touring cabin. Wherever the ship goes they go. There's one stowaway that's never caught and made to work his passage.'

'Poor barnacle,' exclaimed the boy, with a sober face, 'to have to live in the dark, and make a house, and then die and have it used by a loafer of a fish.'

Mason began to chuckle. 'Don't waste too much sympathy on the barnacle,' said he. 'Sometimes the barnacle himself is a star boarder.'

'You mean he lives on some one else? I thought the barnacles all built their own houses.'

'They do, but sometimes they locate their houses on the property of other sea animals.'

'Whose property?'

'A whale's, very often. The barnacles dig into the whale's skin.'

'That sounds like the barnacle and the coral.'

'No, Ted,' objected the scientist. 'Stop and think, and you'll see two differences. In the first place, the coral stands still, while the whale moves. And in the second place, the barnacle in the coral helps get food for them both, whereas the barnacle in the whale does absolutely nothing to pay for his lodging. He simply uses the big fellow for transportation purposes, feeding on small organisms in the water as he travels. Well, let's get back to our sponges, or the Professor'll put *us* down as star boarders!'

Back into the laboratory they went, but though he went on with his note-taking Ted could not get his mind back to sponges and shrimps.

'What's bothering you?' said Mason presently.

'Nothing much, only I was thinking about that whale, carrying a bunch of barnacles around with him, and not even knowing it.'

'He couldn't do anything about it even if he *did* know it,' was the rejoinder. 'And when it comes to that, Ted, a whale often has much more troublesome boarders than that to worry about.'

'What kind of boarders?'

'Fish.'

'How could a fish use a whale as a house?' demanded the incredulous boy.

'By gluing himself on to the roof of his mouth.'

'What!'

'It's our old friend the remora again,' Mason explained. 'They get inside and attach themselves to the top of the whale's mouth by means of that sucking disc, and there they park. Their heads point forward, and so when the whale opens his mouth to eat, the remoras open their mouths and take part of the food without so much as moving.'

'Wait a minute! You said "their" mouths. Do you mean to say that there is more than one remora in a whale's mouth?'

'Certainly. Sometimes there's a whole crowd of them — ten or twenty of them.'

The boy swallowed noisily. 'Ten or twenty fish living on the inside of a whale's mouth. Why, good gracious, that's too wild for words. Don't they ever lose their grip and slide down into the whale's stomach?'

'I don't know,' said Mason slyly. 'And as far as I know, there's only one person that could give you any information on that point.'

'Who's that?'

The scientist reached over to slap him on the back. 'Jonah!' he said, and turned back to his sponges.

CHAPTER XXI

TAKING PICTURES UNDER THE SEA

So the days passed, Professor Bradley working in his steel chamber, Mason busy with his diving, and Ted Farnum helping where he could. The days were all too short; indeed, they were so rich in interest that they slipped by like beads on a chain, out of July and far into August. By this time the boy had become an expert helper and a valuable member of the expedition, and that is why Mason said to him one day,

'This coming week we'll concentrate on taking pictures, and I rely on you to act as assistant photographer.'

'Just as you say,' was Ted's answer, 'if you think I can do it.'

'Have you had any experience in taking pictures?'

'Not much. I've got a little Brownie kodak at home, and I use that once in a while, but that's all.'

But this did not discourage Mason. He simply said that he did not require the boy to be an expert, but rather an intelligent assistant, and then he proceeded to take him into the laboratory for a few elementary instructions. There was plenty of photographic apparatus aboard the Anemone; in fact, Ted had never seen so much equipment in one place. They seemed to have brought along everything: films, plates, great cans of developer, print-paper by the box, tripods, extra parts, a huge chest of miscellaneous aids, and seven cameras, each of which was intended for a particular type of work.

'We shan't use all of these machines,' said the scientist. 'Probably we shall use but three of them.'

'Only three!' grinned the boy. 'And you really think I'll be any help when it comes to working with three cameras?'

'Certainly. Just remember what the face of the clock said when the pendulum was afraid that it couldn't do all the ticking that was ahead of it.'

'What did it say?'

'Why, it told the pendulum that there was nothing to get discouraged about, because it was only called upon to give one tick at a time.'

Ted laughed. 'I see. You mean that I shan't get mixed up because you'll be using one camera at a time.'

'Now you've got the idea. That's just what I do mean. And to keep you from being confused, this early in the game, I shan't even tell you which cameras we're going to use until the time actually comes.'

'When will that be?'

'I don't just know,' said Mason. 'We've got to spend a little time getting ready, first.'

'A little time,' he had said, yet as things finally worked out it struck Ted that a great deal of time was being spent in getting ready to take pictures. To begin with, an entire day was consumed in hoisting the steel chamber, uncoupling its sections of flexible tubing, and storing all this apparatus away in the hold. Professor Bradley was through with his submarine observations; during the remainder of their stay among the coral reefs he would confine himself to laboratory work and to the business of marine photography.

The next step was to move to another 'set.' Once again their silent Norwegian captain took charge of the vessel, directing his motley crew what to do with the sails, and calling his orders as the Anemone glided off in a great arc and went slipping to the south. Five miles beyond the Tortugas group they paused and dropped anchor, after which the Captain and Professor Bradley went prospecting in a boat, to spy out the character of the bottom.

They came back to report that they had found a spur of the greater reef lying to the north and west, and according to the Professor this area ought to provide them with some magnificent pictures of both corals and tropical fishes. The water in most places appeared to be shallow, which, of course, was an advantage, since this would permit the sun to penetrate to the bottom and furnish an abundance of light.

Later on, the Professor and Mason went into a series of consultations as to how to do what they had to do. Their aim was to use up their entire supply of plates and films, but to do this economically, and in such a way as to get a fairly good record of all phases of reef life. Naturally this required a careful plan, and so it was that they made repeated trips in the boat and held long conversations on the subject of ways and means. Ted was amazed, not only at the vast technical knowledge of these two men, but also at their willingness to take infinite pains.

At last, however, everything was ready. They were to begin the following day at ten o'clock, at which time the sun would be sufficiently high and strong to give them the necessary light on the bottom. Before they started, Mason took his young friend aside and showed him the camera they were to use.

'This is called a vertical camera,' he explained. 'It's a special machine, designed only for taking vertical views. Probably you've seen Professor Bradley using it out on the deck, to get pictures of different specimens we'd brought in. For instance, he photographed our squid with it.'

'Oh, yes, I remember that.'

'A camera of this type,' continued the scientist, 'is just what its name implies. Instead of being held in a horizontal position it is pointed downward. You'll see how it works, pretty soon.'

And Ted did see how it worked, although as he soon discovered this was practically all he had to do with the vertical camera. He went out in the glass-bottomed boat with Mason and Professor Bradley, and when they had arrived at their location, it was the boy's job to keep their little craft from drifting too far. His two companions peered and squinted down through the glass and into the clear water, discussing the view of the bottom, and afterward making their exposures. Each photograph was taken with great care: the boat had to be in precisely the right position, every one had to remain perfectly still, and the camera had to be placed lens downward against the glass bottom, with bits of rubber to block it into position. Then a push of the lever and the picture was taken.

For the better part of two days they took pictures through the glass bottom of their little boat, or rather Mason and the Professor took them. As for Ted, he had about decided that he was a photographic assistant in name only when his friend came to him one evening, and said:

'We've just finished developing the last of the plates, and they're good. So that's all we'll do with the vertical camera. The rest of the actual work of taking pictures is up to you and me.'

The boy was a little startled. 'Oh, is that so? What about Professor Bradley?'

'He'll direct us,' was the answer, 'but that's all. From now on our photography will be done on the bottom.'

'With the camera right in the water?'

'Yes.... Professor Bradley doesn't dive any more. He used to, in fact he's made hundreds of descents, but he feels that he's too old for that sort of thing now — especially since he suffers from rheumatism — so he's made it a rule to stay out of the water. We'll let him stay in the boat with Captain Nordstrom, and you and I'll go down with the camera.'

Ted did not know what to think of this talk of taking a camera down into the water. 'It would spoil it to get wet, wouldn't it?' he asked.

'Not the kind we have,' was the smiling answer. 'Come into the laboratory and I'll show you.'

They went into the little tent, and there the boy saw what he afterward described as a *real* submarine camera. It was a graflex, using plates, and capable of making pictures four inches wide by five inches long. Most important of all, this camera was provided with a brass case, so constructed that it could slip over the instrument and keep it safe from the surrounding water.

'Is that brass case *absolutely* watertight?' asked Ted.

'Absolutely, if it's handled right. See, the rear end of the case opens, so that the camera can be inserted. Then you close it. This rubber gasket goes between the lid and the box, and if you screw these ten little nuts perfectly tight against the rubber, the case will never let in a drop of water — at least it hasn't yet.'

'I see. And the pictures are taken through this glass window at the other end of the case.'

'Um.'

'What about water leaking in around the lever that you press when you take a picture?'

'That's provided for,' said Mason. 'There's a special arrangement of rubber and metal that allows us to move the lever without letting any water into the case.'

'Well,' said Ted, with sudden emphasis, 'that's quite an invention.'

'It's more of an invention than you realize,' was the answer. 'Submarine photography is a very new thing; in fact, Professor Bradley can remember when the first attempts were made. So even to get a camera as good as this there had to be years of experiment, and very costly troublesome experiment, too, sometimes. Well, we'll try it to-morrow, if it's a good day. I must go ask the Captain what he thinks of the weather. It gets tricky along about this season.'

The Captain declared, in his brief way, that to-morrow would be a good day; and a good day it was, the sky without a cloud, the air still, the sea clear and smooth.

About ten o'clock they set out, Mason and Ted and Captain Nordstrom, the Professor staying in his bunk with a sick headache. With them they took their photographic equipment, as well as diving-hose, two helmets, and the pump, this last to be tended by the Captain.

Mason went down first, leaving the others in the boat, and also leaving behind his camera, tripod, and every other bit of equipment except a steel rod, about six feet in length. The water at this particular spot was less than four fathoms, so that Ted could look down to the bottom and see everything that his friend did. He watched the diver walk off toward a group of corals, steel rod in hand. Then he saw him hold the rod down at the level of his knee, pause and look about, move off to one side a little way, and repeat whatever it was that he was doing. After a quarter of an hour of this he came back up to the boat and lifted off his helmet.

'What's the idea of the steel rod?' laughed the boy. 'You looked as if you were doing a mystery dance down there.'

'That's my measuring stick,' said the other. 'It's exactly six feet long and I use it to get my distances. And that's why I came up — I want you to come down and help with it.'

'Good!' cried Ted, and got up to get his helmet ready.

'There are so many points to measure from,' the scientist went on, 'that I'll save time by doing it all at once and putting down the figures. I'll take a pencil and one of these zinc tablets, and as you measure I'll put down my notes. Then I can take all my pictures at one time, without leaving off to measure every time I take a new position.'

The boy got into his diving outfit and followed Mason down the ladder to the bottom. He began to measure with the steel rod, taking his cues from the motions of his companion's hand. Now and then the scientist dug a hole in the sand to mark one of the spots where he expected to set up his camera, and from that point he had Ted measure off the distance to various types of coral growths.

'What time is it, Captain?' asked Mason, whed finally they came up.

'Eleven o'clock.'

'I thought it must be. This sort of thing is like a dinner-party — you spend four hours cooking your food and twenty minutes eating it up.'

Ted had taken off his helmet and was sitting in the boat, waiting to see what was next.

'You stay here now,' the scientist told him, 'and let the camera up and down. I'll take a picture of that brain coral first, I think. Be sure to close this brass case very, very carefully, won't you?'

'Yes, I will,' said the boy; then he added hurriedly, 'Aren't you making a mistake, Mr. Mason? That brain coral is eighteen feet from the place you've marked for the tripod, and you're setting the camera for twelve feet!'

'You're right,' smiled the other. 'And I'm right, too. It's this way, Ted. When you're taking pictures on the bottom, you've got to set the lens to about two thirds the actual distance, because of the refraction of the water.'

'Oh!'

'Now we're ready,' said Mason briskly, and handed the camera to the boy, to put safely to one side.

'It's going to be heavy down there,' observed Ted, lifting the brass-covered camera up and down.

'Bulky, but not heavy,' said the scientist. 'The water will buoy it up. That's why it's just as well that our tripod is mostly iron, otherwise the whole combination might float off.'

He got over the side of the boat onto the ladder, and after a few last instructions put on his helmet and went down again. As soon as he was on bottom, Ted lowered the heavy tripod to him. Mason set it up and immediately signaled for the camera, whereupon his assistant tied a rope through the handle in the top of the brass case and lowered it over the side. Then the watching boy saw him place the camera on the tripod, adjust it, and presently snap his picture. Afterward the brass case came up on the end of a rope, so that the exposed plate could be taken out and a new one inserted. Following this simple but important operation the camera went down again.

Three days of this and the sky clouded over and there was no longer any sunlight down where Mason had been taking pictures.

'What shall we do now?' said Ted.

'Use a flashlight,' was the answer. 'There's one more picture down there that I want, and there isn't time to wait for the sun to come back.'

'Is our time so short?' asked the boy, opening his eyes wide.

'Well, yes, considering that we have to move down the reef to-morrow for some fish pictures. This is our last day here, so I'll use a flashlight for my last exposure.'

Whereupon Ted Farnum had another lesson in scientific ingenuity. They built a raft and placed upon it a dry-cell battery, a pound of magnesium, and a reflector, this last being a white sheet which stood up above the raft on poles. The purpose of this reflector was to throw the light down into the water, instead of permitting it to waste itself in the air. Lastly they made a hole in the raft, so that the exploding powder could be reflected directly downward.

Mason now arranged his electrical connections and went down with the camera. With him he took a cunning contrivance which would enable him to set off the charge of magnesium at the precise moment that he pressed the lever of the camera. The Captain and Ted drew off with the motor-boat as far as they could and still send him air, then they waited.... Five minutes later there came a blinding flash from the raft, and presently up from the bottom came the photographer.

Technically this feat was something to boast of, yet when they had developed the plate and saw that it was satisfactory, Mason simply said: 'Well, that's that. Now we must put our "still" camera aside, and get out the De Vry.'

The De Vry turned out to be another camera, and as soon as the Anemone had moved down the reef and the sun had come out again, they prepared to use it. This new camera was a motor-driven instrument, designed to take moving pictures on a standard 35 mm. film, and fitted with a brass case similar to that which had enclosed the graflex.

'This'll be easier to work, won't it?' said Ted.

'Yes, and no,' said Mason. 'The camera is simplicity itself, because all you need to do is to push the button and wait for it to grind out its film. There's a spring which I wind, and when I feel a certain slight vibration I know that this spring has run down, which means that the roll of film has been exposed and the camera has stopped. But the trick is to keep from wasting film.'

'How do you mean?'

'I mean that the operator must make sure that there's something in front of the camera that's worth spending two hundred feet of film on. In our case, for instance, we've got to get fish before the camera, and that requires a little maneuvering. I think the best way to do it is for you to take a sea-urchin, walk slowly along in front of the camera, and keep dropping pieces. Then the fish will follow you, and I'll keep the camera on them.'

This arrangement seemed simple enough, and yet it did not work to Mason's satisfaction. He loaded the camera, wound it up, and set the lens. Down the ladder he went and after him came the boy. The scientist placed his camera on the tripod, and Ted proceeded to bait the fish as he had been instructed. But Mason slowly shook his big clumsy helmet and motioned for him to try it again, at the same time making gestures which the boy did not understand. They tried it over, and still the photographer was not satisfied. In the end he signaled that they were both to go back up to the boat.

'It's all wrong,' he told Ted, when they could talk. 'You're not getting any of those paradise fish, and that's the species that I particularly want. I think I'd better bait them, and let you mind the camera.'

'All right, if I can work it.'

'Why not? There's just one thing to look out for, and that's the finder. It's a little hard to use because of the peculiar way it's arranged. Naturally you can't look down into it when you're under water, for fear of flooding your helmet, so we've had this finder fitted up with a mirror, set at an angle, so that you can see into it without bending over. Just be careful about that and you'll be all right.'

Back down to the bottom they went, Ted to mind the camera and Mason to decoy his paradise fish within range. The boy saw him walk slowly off and slowly come back, dropping bits of sea-urchin for the swarm of ravenous little fish that followed him. He located them in the finder and pushed the button, after which it was simply a case of shifting the camera on the tripod as the strange procession passed along, within fifteen feet of the lens.

'Fine!' exclaimed Mason, when they were back in the motor-boat. 'I don't know of any reason why this won't be a dandy film.'

'I hope so,' said the boy.

'And when the Professor shows that film in his classroom next fall,' went on the scientist, 'he ought to remember to announce that it's Ted Farnum at the camera!'

They went back to the Anemone in high spirits, Mason gayly announcing that they had made a moving picture of a group of paradise fish.

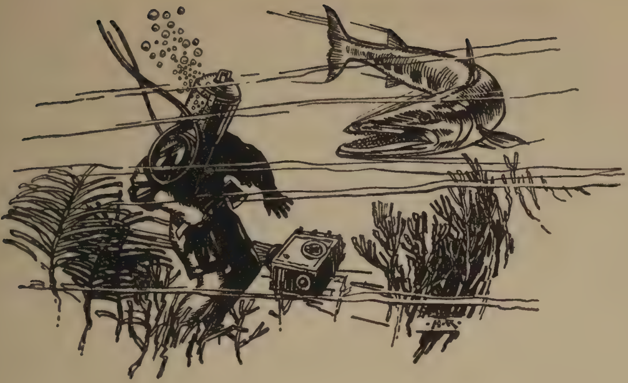
'Excellent,' said the Professor, rubbing his hands. 'But you'd better go back and make another. I want at least two films of that particular species.'

Mason did not answer, but his face had changed in a very peculiar manner, and when Professor Bradley had gone back to the laboratory Ted said to his friend, 'What's the matter? You don't seem to like the idea of going back down there.'

'I don't,' said Mason grimly.

'Why not? Are you afraid I can't operate the camera?'

'No; it's because I saw a big barracuda down there, just before we came up.'



CHAPTER XXII

LOOK OUT FOR THE BARRACUDA!

'A BARRACUDA?' said Ted.

Mason nodded. 'Yes.... I didn't say anything about it before, because I thought we'd move to another set and wouldn't have to go down there again.'

'But what is a barracuda?' asked the boy anxiously.

'A barracuda,' said the scientist slowly, 'is a fish.'

'Oh, is that all? I thought you meant a ——'

'Is that all!' exclaimed Mason. 'Well, that's enough. A barracuda may be all the way up to eight feet in length — although this one is only about five, I think. Most people are more afraid of them than they are of a shark.'

'Then they *must* be bad!'

'Um. I've seen West Indian natives that would dive and swim around sharks all day, and never think anything of it, but just let some one yell, "Look out for the big barracuda!" and they'll come to the surface like a pack of frightened rabbits. The natives tell all sorts of wild tales about this fish, and even if two thirds of them are exaggerated the other third is enough to give the barracuda a bad name. They call him the Tiger of the Sea.'

'Whew!'

'A barracuda is long and slender,' continued Mason, 'like a pike.'

'That doesn't sound so bad.'

'No, and they don't look so bad, except for the face. There used to be a barracuda in the Aquarium over at Miami Beach, and he was such a mild-looking customer that the children used to feed him by hand, and even stroke his back. The funny part of it was that he'd let them, and never so much as threaten to hurt them. I forget just what variety he was.'

'Is there more than one kind?'

'Yes, there are several varieties. They're not well known. Most of them are solitary fellows, like the sharks. You hardly ever see a crowd of them.'

Ted was blinking thoughtfully. 'Did you say this one you saw was only five feet long?'

'About that.'

'Well,' said the boy, 'that isn't a very big fish. Why should we pay any attention to him? He wouldn't come at us, would he?'

'Perhaps not,' said Mason, almost casually. 'Still, a barracuda will tackle fish several times its own size, and they often tackle human beings, too.'

'What with?'

'With their teeth. They have a terrible set of them, long sharp teeth like a dog's.'

There was a little silence. They were both thinking of the barracuda that Mason had seen.

'As far as I'm concerned,' said the scientist presently, 'I'm willing to go down. I've worked around barracudas before, and, besides, I want to get that film for the Professor. But I can't do it alone, and I don't want to take the responsibility of taking you down with me.'

Ted answered very quietly. 'It's just as you say, Mr. Mason. I don't want to do anything I shouldn't... but at the same time I should think we could take a chance. Maybe that barracuda won't be there, and if he is maybe he won't bother us, and even if he does come snooping around, maybe we can scare him off. We could take a couple of hatchets along. And anyhow, Professor Bradley wants another film of those paradise fish.'

'That's right,' said Mason. 'He wouldn't understand if I refused to go down again. It's been so long since he was in a diving helmet that he's probably forgotten what the handicaps are.... I'll tell you what we'll do, Ted. We'll take the motor-boat and go back there, and I'll leave you in the boat with the pump while I go down and see if he's still there.'

This plan they at once proceeded to put into execution. Mason went over the side and Ted stayed in the boat, to mind the pump and keep a sharp eye on the train of bubbles that kept rising from the helmet underneath the sea. His friend was gone an hour, but when he returned he reported that the big barracuda was nowhere to be seen.

'That's fine,' said the boy. 'Now we can get our picture.'

'Yes, we'll try it. I'm glad he seems to be gone, because we haven't any time to find another group of those paradise fish. It's either this bunch or none. Well, don't say anything about barracudas to the Professor now. We'll simply bring the Captain along to-morrow and go down after our picture.'

Back they came the next day, bringing with them diving equipment and photographic apparatus, and also a hatchet for Ted and a long sharp butcher knife for Mason.

'There isn't much coral underbrush down there,' said the scientist, as he started the pump, 'and that'll help. Just slip your hatchet through your belt, and keep your eye peeled, and I think everything will be all right.'

Everything started smoothly enough. They got to the bottom and signaled Nordstrom to lower the tripod and the camera. Then Mason walked off through the water, leaving Ted to set up the camera. Presently the scientist came back and made signs that the paradise fish seemed to have strayed off, after which he went away again, searching for them, the long blade of the knife gleaming at his side.

The boy turned to his camera, settling it firmly upon the tripod and peeping into the little mirror that enabled him to see into the finger. Then suddenly he straightened up, for in the hazy glass of the moving-picture camera he had caught sight of a long heavy fish that he had never seen before. Now he saw it straight out ahead of him, and, although the creature was absolutely strange to him, he knew it for what it was — a barracuda. He recognized the long, slender, powerful body, the projecting underjaw, the great mouth, and cruel, wolfish teeth. The fish was a dirty brownish-black above and a livid white on the belly. The eyes were very large, and so set as to see in all directions. Ted took in all this at a single glance.

He was not frightened. Why should he be? At his side hung a hatchet, and, besides, the barracuda seemed to be even less than the five feet that the scientist had assigned to him. On the other hand, the boy realized that this fish might prove dangerous. It occurred to him to go after Mason, and warn him to look out for their visitor. Yet he did not do this, simply because it was clear to him that the barracuda was not interested in Mason. The great fish had eyes only for the boy.

Slowly the barracuda swam round and round him, describing a circle with a radius of some fifteen feet, with Ted in the center. The fish moved in a curiously sluggish manner; nevertheless, the boy could see that he meant mischief, and so as the barracuda went round and round Ted turned his heavy steel helmet, first one way then the other, in order to keep him in sight. Mason was now visible in the watery distance, but he was twenty-five feet away, and apparently coming at a very slow pace, tolling his little paradise fish and ignorant of what was happening to his young friend. The boy knew that he must depend upon himself, and so he no longer looked in Mason's direction, but drew his hatchet and tried to keep face to face with the barracuda. The monster was gradually narrowing his circle, until by now Ted had a clear view of his rolling eyes, his curling lip, and his wicked teeth. The whole aspect of the fish said that he was merely waiting for a chance.

That chance came a minute later. Ted decided to retreat to the neighborhood of a coral tree, in the hope that this would make it easier for him to keep an eye on his enemy. Slowly he backed along the bottom, one step after another. Then he made a misstep, half stumbled, and recovered himself only to brush his leg heavily against the coral tree. He felt the harsh stuff rip his trouser leg and gouge into the skin. Instantly the barracuda was transformed. No longer was it a slow, sluggish fish, but a demon, livid and horrible, and darting around and around the boy with such incredible speed that his eyes could not follow. Just then he had not the slightest notion as to the cause of this change, but later he knew. The coral had gashed open his leg; a trickle of blood was coming from this wound, and, although it was no more than a trickle, it was enough to set the barracuda mad.

Around and around in a narrowing circle the great fish dashed, then with a furious rush it came at him. Instinctively he brought up his hatchet. The barracuda came full against it, and dashed off on an angle. The creature appeared to be confused, yet it was only for an instant. Before Ted could collect himself the fish was flashing around him again, its teeth gleaming and its horrid eyes searching for an opening. The boy threw a desperate look in Mason's direction. The scientist had apparently seen what was wrong, and was hurrying up as fast as he could. Help was coming — but so was the barracuda — the beast swirled up again, snapping at him like a mad dog.

After that Ted Farnum had a very hazy notion of what was happening. He felt himself falling, and with a sudden wrench he threw off his helmet and started to unbuckle the heavy lead belt which kept him from rising to the surface. His mouth filled with water. Mason was close, but the barracuda was also close, although for some reason the fish was not biting him — it was simply threshing about and thumping him unmercifully with its tail. Then he lost consciousness...

... Slowly, very slowly, the mist cleared away from his brain. His first sensation was of pain, heavy, long-continued pain.... Presently he seemed to be swimming under water, and struggling against a powerful current of some kind.... The scene changed. Now he was at an encampment of boy scouts — at a lake — in the Adirondacks. He was trying to revive a comrade who had come near drowning. They had loosened his clothing and were forcing his mouth open, so that they could get a stick into it, and thus keep him from biting his tongue. Some one was manipulating some one's arms, and counting...

A moment later he came out of all this painful confusion. He was not in the Adirondacks; he was in a motor-boat, hanging over the edge and dully staring into the water, while some one worked his arms up and around and over his head. There was the sound of voices. Mason spoke. Then Captain Nordstrom said something.

Fifteen minutes later he was sitting up, dazed and pale. The boat was chugging back to the Anemone.

'Feeling better?' said Mason.

'Yes,' he answered slowly, and gazed down at the bottom of the boat. There lay the barracuda, dead. Blood was dropping on it from somewhere. He looked up. That blood was coming from Mason's right arm. It was scraped and gashed from the knuckles halfway to the elbow.

'That's nothing,' said Mason. 'A little iodine will fix that. You need some on your leg, too.'

They were almost to the schooner when Ted looked up again.

'Thanks, Mr. Mason,' he said. 'I guess you saved my life, didn't you?'

'Don't thank me,' was the evasive answer. 'I'm glad I finished that brute.'

'How'd you kill him?'

'With my arm,' chuckled the scientist. 'I jabbed at him with my butcher knife, and it cut straight through his gills, so I simply rammed my fist on out between his jaws and strung him on my arm. He thumped us a lot while we were getting to the surface, but that was all he could do.'

'Except tear open your arm,' said Ted.

'Nothing but scratches,' declared Mason. 'He couldn't work his jaws enough to bite.'

Back on the Anemone again, they went to the laboratory for iodine and bandages. Professor Bradley was there, and when he heard the tale he made them sit down as if they were invalids, while he himself acted the part of nurse. He bandaged Ted's leg and Mason's arm, and told them not to plan to go back down for the camera and tripod, but stay in the boat and put down grappling irons.

'We'll get our things all right,' said Mason. 'Now that Mr. Barracuda has joined our party, there's nothing to be afraid of.'

'What started it?' asked the Professor, and when Ted had described the change that came over the barracuda when he scratched his leg, the scientist nodded and rubbed his beard in the curious way he had. 'That's characteristic,' he said. 'The size of a fish has no necessary relation to its ferocity. Of course the barracuda is not so bloodthirsty as *Serrasalmo niger*, but it's bad enough. Well, if you boys are comfortable, I'll have that rascal brought aboard.'

He went out, leaving them to talk it over. Once more Ted thanked his rescuer.

'Don't say anything more about it,' said Mason, in confusion.

'I can't imagine how you did it,' continued the boy, as if he had not heard. 'Just to kill that barracuda and get me to the surface must have been an awful job, to say nothing of taking care of yourself in a diving suit.'

'That's where this helmet diving's got the complete suit method beat a mile,' said the scientist hurriedly. 'All I had to do was throw off my helmet and cut my belt, and I was ready to — well, we got out of it, anyhow, and that's the main thing. I had no business to let you take such a risk.'

'Everything would have been all right,' observed the boy thoughtfully, 'if I hadn't torn my leg on that coral. But it was a wild performance after that happened.... Imagine a little blood setting that barracuda crazy like that!'

Mason nodded vigorously. 'It just gives you an idea of how ferocious some of our finny friends are. When it comes to being bloodthirsty, though, the world's prize goes to the fish that the Professor just mentioned — *Serrasalmo niger*.'

'Who's he?'

'Well, he's not much to look at, because he's only a little fellow — twelve to sixteen inches long — but just the same he's a very dangerous customer. *Serrasalmo niger* is a South American fish, known among the natives down there as the *piraya*. As I say, they're small, but they have terrible teeth and jaws, and they can take a chunk out of you as neatly as a barracuda could.'

'Do they attack people?'

'They attack anything. I used to know a biologist by the name of Merson — specializing in marine ecology — and he had had a personal experience with these pirayas, down in the South American jungle. According to his story, he and a friend were riding along on their horses, when pretty soon they came to a stream. It was about twenty feet across, as I remember, and rather shallow. Merson waded his horse in first, and of course he never dreamed of any danger. I think he said the water wasn't even up to the horse's belly. Anyhow, he started across, but before he was halfway to the other side his horse gave a jump, and when he looked down into the water it was alive with these little pirayas. One had bitten the horse, and the blood had drawn a whole crowd of them. As soon as he saw what was up, he yelled for his friend to hurry up, and at the same time he spurred his horse on toward the farther bank. He got there all right, but his friend hadn't paid much attention to him, and there he was, not halfway across and the fish literally tearing the flesh off his horse's legs.'

'Heavens!' cried the boy. 'What happened then?'

'The horse made a plunge for the bank,' continued the scientist, 'but he didn't make it. He fell down, and of course Merson's friend went head over heels. Luckily for him, he fell practically on the bank, so that Merson was able to pull him out.'

'And the horse didn't get out?'

'No.'

'What became of him?'

'The fish ate him.'

'What!'

'Certainly. There were hundreds of those hungry little demons hanging on to him, and probably they hamstrung him as soon as he fell, or even before. The two men stood there on the bank and saw those pirayas devour the poor brute. They swarmed over him like wolves.'

Ted shuddered. It seemed incredible that such bloodthirsty fish existed anywhere in the world, yet there was no doubting the story. Even the sight of Mason's bandaged arm and his own memory of the rushing attack of the barracuda made him realize what it must have been like for that poor horse. And had it not been for the prompt arrival of his friend, he himself would probably have been torn to pieces by a ferocious demon of a fish and eaten alive under the sea, the beautiful, tranquil sea that he had learned to love and trust.

The flap of the tent was lifted. In came the Professor, followed by Joe, carrying the dead barracuda in his arms.

'Do you boys want to see the fish before he goes to pot?' asked Professor Bradley.

'Yes; let's have a look at him,' said Mason.

Joe brought the thing forward and they examined it, commenting on the solid, wedge-shaped head and the amazing teeth. Then Mason looked up at the darky with a twinkle in his eye.

'How would you like to have one of these chaps come up behind you, some time when you're swimming, Joe?'

'Who? Me?' exclaimed the colored man, with bulging eyes. 'Say, Mistah Mason, don't talk like dat—it might come true. He may be daid, but he's sho' got some brudders in de sea.'

'What are you going to do with him, Joe?'

'Ah's goin' cook dis ole sea tigah!' said Joe, grinning widely. 'De Professah tole me Ah better make him into some fried fish, right away. My goodness, Mistah Mason, you sho' got nerve to tackle dis fellah. I wouldn't do dat fo' ——'

'All right, Joe,' interrupted the scientist, 'take him away. We'll have some of him for supper.'

The darky went out with the fish, followed by the Professor.

'Are they good to eat?' said Ted, turning back to Mason.

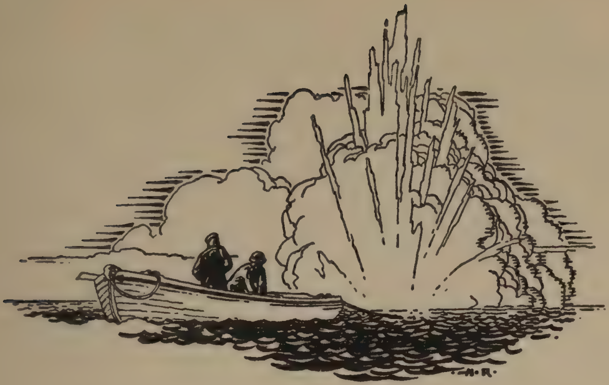
'Oh, yes, indeed. Barracuda is good eating. Haven't you ever seen them on a bill of fare?'

'No.'

'They have them sometimes. I don't know that they do in Baltimore, but I've eaten barracuda in San Francisco. It was a different variety, as I remember.... You don't object to eating a piece of this fellow, do you?'

The boy began to laugh.

'I should say not!' he cried. 'In fact, I think I'm going to enjoy it. It may sound queer, but that old barracuda tried to eat me, so why shouldn't I turn around and eat him!'



CHAPTER XXIII

DEATH COMES TO THE CORAL FOREST

As for the camera and the metal tripod, both of these articles were recovered the next day. Mason went down and found them, after which he tied them to the end of a rope, and then Ted himself hauled their lost equipment to the surface.

Nor did they content themselves with this. They returned to the schooner, inspected the camera, made sure it had not suffered the slightest injury, and prepared to take more pictures. Again and again they went down, grinding out film in two hundred-foot lengths, and securing a valuable series of moving pictures of various dwellers of the coral reef, including the Professor's little paradise fish. No more barracudas came prowling around. Everything was perfect — except that their summer was now practically gone. A few days more and the Anemone would have to turn back toward home.

On the afternoon preceding the day which had been set for their departure, Mason and Ted Farnum made a discovery. Their last roll of film had been used up, the cameras had been packed away, and they had gone out in the glass-bottomed boat. The purpose of this little excursion was to explore a distant and unknown section of the reef, and after they had been aimlessly cruising about the surface for a half-hour or so, they looked down and saw what appeared to be the top of a very ancient coral growth. Mason pronounced it the remnant of an old coral forest. So did Professor Bradley when he had heard their report.

'It might be worth while to go down and look it over,' said Mason.

'Would there be time?' asked the Professor.

'I think so. Nordstrom doesn't intend to hoist sail until late to-morrow afternoon, so we'd have practically all day to-morrow.'

'In that case I wish you'd go down and look things over. If this growth is as old as it seems, it may throw some light on the rapidity with which coral reefs build up. Perhaps you can break off some pieces for us to take home and study at our leisure. Our young assistant here will go with you, won't he?'

Ted hastened to say that he would gladly go along, and the thing was agreed upon. In his heart he was thanking his lucky stars that he was to have one more day of diving before going back to Baltimore.

That evening they made their preparations, and the next morning they set out, prepared to bring back specimens of the coral forest. The motor-boat was loaded: Mason and Ted and their diving outfits, Captain Nordstrom and the pump, and an abundance of stout ropes and pulleys, besides an assortment of hammers and sledges.

They reached the spot, located the dark tops of the coral jungle, and brought the motor-boat to a halt.

'First we'll make a preliminary survey,' said Mason, 'just to see what we're up against.'

'And leave the hammers and ropes in the boat?' asked the boy.

'Um. We'll come back up and get them in a few minutes.'

But alas! for Mason's plans; it was not a few minutes but a few hours before they had occasion to use their hammers and ropes.

Down the ladder they climbed, one helmeted figure after the other. Once on bottom they paused to get their bearings; then they were treated to a series of surprises. To begin with, the corals were much taller than they had expected. The two divers were familiar with the fact that undersea growths are always of greater height than appears from the surface, yet in this case it was apparent that they had underestimated the difference. The corals which loomed up ahead were easily twice as tall as an ordinary man, and some of the trunks were more than two feet in diameter. It was a dense colony of living animals, so dark and gnarled and thick that as they walked slowly toward it the tangled mass appeared to them as an ancient and impenetrable jungle. In contrast to all the corals that Ted had previously seen, this growth was ugly and gloomy and decidedly unattractive.

Silently the boy and his friend approached until they had come within seven or eight feet of the barricade. And there they paused to look, gazing upon it like explorers who have lost their way and have at length come to the frowning wall of an ancient and forgotten castle. Yet the place was not altogether abandoned, for even as they halted before it a monster showed himself in a dark cave at the foot of the coral wall. It was as if he were a dragon, set here by some evil magician, to guard the castle and keep all comers away.

Ted saw the creature instantly. He hastily turned to his friend, and he knew from the expression on the face within the helmet that Mason, too, had seen it, and was waiting for it to show itself more plainly.

Presently the monster satisfied their curiosity by drawing its nasty length out of one hole in the coral and curling back into another. It appeared to Ted as some kind of huge snake, dark brown and hideously long and sinuous. The head was large and mouth small, and down the back there was a fleshy mane or ruffle. In and out of its den it twisted, opening its mouth and gazing at them in surly defiance. The boy could not have said how long it was, yet he was positive that it was longer than the barracuda that Mason had killed.

A tug at his arm made Ted turn back to his friend. The scientist was motioning for him to come away.

They retired, got to the ladder, and went up to the boat. The Captain took their lead belts and helped them in.

'That was a giant moray,' said Mason, as soon as they were able to talk.

'Is it a fish?' asked the boy. 'He looked more like a snake.'

'The giant moray is an eel,' was the response, 'and the largest of the eels, at that. There may be a whole nest of them in those holes down there.'

'Whew! That doesn't sound good.'

Mason turned to the Captain. 'Let's get back to the schooner.'

This remark seemed to Ted to be an admission of defeat, but, as he was shortly to learn, he had not yet plumbed the depths of his friend's resource. The giant moray was a formidable antagonist, and it would be foolhardy to challenge him on his own grounds, yet there was another way.

'Tie up for a minute and wait for me,' said Mason, when Nordstrom had brought the boat back to the side of the Anemone. 'Stay there, Ted, I'll be back.'

He went up the ladder, and presently returned with a coil of wire, a kind of iron box, and two objects resembling large white sausages.

'All right, Captain.'

Nordstrom took them back to the coral forest, whereupon the scientist prepared to lower his two 'sausages' by means of the wires he had brought along.

'Dynamite,' said the Captain quietly, and then Ted understood.

They let down the two sticks of explosive, chugged off as far as the trailing wire would let them, and came to a standstill. Mason got his iron box into position. Down went the plunger, and a moment later there was a muffled roar, with water flashing up from the spot where they had lowered the dynamite, and their motor-boat rocking violently to and fro from the force of the explosion. When they looked down toward what had been a jungle of ancient corals, they could see nothing but milky, troubled water.

'Now,' said Mason, 'we'll go back to the vessel and have an early lunch, and come back. By that time the water will be clear again, so that we can go down and work.'

Once more they returned to the schooner, this time for a mouthful of food, after which Mason handed his assistant a large bottle of olive oil and advised him to strip and rub the stuff into his skin.

'What for?' said Ted.

'The oil will help you resist the chill of the water. I generally rub myself with it when I'm going to be down a long time.'

'I see... but are we going to be down a long time?'

The scientist gave him an odd smile. 'Ted,' said he, 'don't you realize that this will be your last visit to the bottom before we start home?'

'Do I! I guess I do!'

'Then you'll probably want to stay down as long as possible,' was the retort. 'Of course, if you don't want to, then you needn't bother with that olive oil, and you ——'

But the boy had already vanished into the sleeping-tent, taking the bottle with him.

Mason was not old, yet he was wise, and when they had returned to the scene of the explosion, it was apparent that he had used the dynamite with a double purpose in mind. He had wanted to destroy the giant moray, and he had succeeded. At the same time he had planned to save himself and Ted a good deal of hard, painful labor by substituting dynamite for the hammers and sledges with which they had expected to break up the coral jungle, and in this also he had succeeded. The moray had been blown to tiny fragments and the massive animal trees had been rent asunder and were lying in pieces on the ocean floor, plainly visible through the clear water.

'Dynamite is sometimes a labor-saving device,' said the scientist, as they got ready to go down. 'Two little sticks of it have done more than we could have done in a week. All right, Ted, put on a pair of these heavy gloves, so you won't cut your hands, and we'll go down and tie on to a few pieces for the Captain to haul up.'

Lifting on his helmet, Mason seized a rope and a pair of gloves and went over the side.

Ted took more time. He was keenly aware that this was his last descent, and he did not propose to lose any of the pleasure of it. How his point of view had changed since the first time he had stepped out onto the steel ladder like this! Upon that occasion he had been ill at ease because of the prospect of going down into the water, and now he took such joy in that same prospect that he loved to dwell on it and delay it. Down over his head came the helmet; he stepped lower and lower upon the ladder, and as the little waves came tapping lightly against his glass vizor, he murmured to himself, 'It's the last time I go down... the last time...'

Down step after step he went, down into the cool, delightful sea, to the bottom. Then for half an hour it was work. He helped Mason get their stout ropes about this and that piece of coral, and afterward he drew away and tried to keep their lines clear while the Captain hauled their prizes to the surface and piled them in the back of the motor-boat. More than a dozen specimens were taken up in this way.

The boy would have preferred to send up more, simply for the sake of prolonging this last session under the water, but already Mason had signaled to the Captain to pull up the hoisting ropes. They had finished their task.

Then Mason caught sight of something in the water beyond the ruined forest. This something was a lattice or network of lovely coral, growing up from the bottom at a distance of some twenty feet from where the two divers had been working. They had not seen it that morning because of the dark, concealing wall which they had later destroyed with dynamite, and they had almost missed it upon this second visit because they had been so busy gathering their specimens. But now the beauty of the thing burst full upon them, and so by mutual agreement they walked toward it, signaling for the Captain to give them more line.

The coral network had been lovely from a distance, and it was even more exquisite from a closer view. It was the color of ivory, and although it was actually a populous colony of little polyps, it resembled a marvelous piece of sculpture. Moreover, it was a screen which concealed a host of other marvels, for when the two visitors peeped through it they saw wonder upon wonder — a great coral shaped like a candelabra, purple fans waving softly to and fro, new and rare anemones, a stretch of white sand, and on this gleaming carpet a luxuriant scattering of starfishes, flowering worms, and tiny coral trees less than two inches in height and colored a delicate pink.

Strangely enough, all these marvels appeared to form a garden for the magic castle that rose up in the background. There were curious growths that looked like battlements and turrets and gates, and off to one side there was even something resembling a drawbridge. It was for all the world like a small fairy castle, fashioned out of living coral by the mysterious intelligence of Nature.

Mason tugged at the boy's sleeve. Ted looked at him, and to his great satisfaction the scientist made motions to indicate that he himself was going back up to the boat, but that his young assistant could stay. The youngster nodded, as a sign that he understood. He knew that his friend wanted him to stay as long as possible, and he knew also that Mason would keep an eye on him down through the clear water, in order to make sure that everything was all right with him.

Another moment and the boy was alone. He went on peeping in at the enchanted garden and the marvelous fawn-colored castle, and presently he decided to get closer.

Slowly and silently he moved around the end of the latticework, taking care to keep his lines clear, and going very quietly, as if afraid of disturbing the inhabitants of this place. But apparently his coming disturbed no one. The tinted polyps continued to wave their tentacles as before, and when he had seated himself on a patch of white sand the fishes themselves resumed their silent drifting back and forth, and around, and in and out. He had been accepted as a part of the scene.

How long he sat there he never knew. It was like being in fairyland. Everywhere he looked there was color, but always it was soft, harmonious color, soothing and restful to gaze upon. Save for the steady throb of the pump in the boat above the water, there was absolute silence. There was movement, yet it was quiet, graceful movement. A procession of little fishes slipped through the windows and doors of the enchanted castle, but whether they were butterfly-fish, spotted hinds, or tiny moonfish the color of mother of pearl, they moved with such ease and such absence of sound as to appear almost unreal. But as far as that was concerned, the whole thing was unreal — fishes, blossoming worms, and coral castle...

Suddenly there came a tug at his life-line.

He roused up, startled out of his day-dream. That jerk was an inquiry from another world, asking if he were all right.

'I'm all right,' he signaled back, and rose to his feet.

A pause. Then came another tug at his life-line, quickly followed by two more. It was the command to come up.

Ted turned and looked at the garden and the castle for the last time, then slowly he walked away, leaning heavily against the water as he made his way to the ladder, and afterward climbing step after step into the world above...

CHAPTER XXIV

THE ANEMONE TURNS BACK TOWARD HOME

Ted Farnum climbed up the ladder and out of the sea. Slowly his helmet rose above the surface. He saw the side of the motor-boat, then the face of his friend, then the wide blue sky.

Mason helped him with his helmet, saying, as the steel dome came off, 'I thought you'd gone to sleep down there.'

The boy only smiled by way of answer. He could not speak. Because he was homesick, not for Baltimore, but for the bottom of the sea. All the way back to the Anemone he was silent. Nor did he say a word as he made his way up the side of the schooner. For this, too, was a last ascent.

'Excellent,' said the Professor, beaming down at the pieces of coral they had brought. 'They look very interesting, indeed. Nordstrom, you can get ready to start, and the rest of us will put these corals away.'

The boy helped until their specimens were safely put away, then he took care of his diving equipment, uncoupling the air-hose and cleaning and oiling the helmet. It cost him a pang to wrap it up, and another and greater pang to store it in the hold. The outfit had introduced him to a new and very wonderful world, but now he was through with it. He would have no further opportunity to use this helmet, no further opportunity to feel the life-giving air rush down to him through this air-hose.

Meanwhile, the deck had been cleared. All of the apparatus and furniture which had occupied the three tents were removed, piece by piece, and packed away in the hold. One by one the tents followed. Joe had made up their berths in the Captain's quarters aft, and there they were to sleep on the way home, just as they had done on the voyage down. Finally the hatchway was closed. Everything was in readiness.

By this time the gorgeous tropical sun was hanging low in the west. Joe got together a light supper, and as soon as all hands had eaten they gathered on deck. The Captain took charge. In came the anchor and up went the jib and fores'l. The vessel trembled to the wind, as if she knew that her long weeks of idleness were over, and that now she was bound for home. They set the mainsheet, then the engines started, and the Anemone was on her way, heading east, with Loggerhead Key on her port bow.

Joe went below, to wash his dishes, but every one else was on deck, the Captain steering, Ted and Mason sitting against the forward companionway, and Professor Bradley pacing up and down at the stern of the vessel.

'He's aching to get back,' smiled Mason, 'so he can get to work on the problems that this trip has brought up.'

Ted was gazing out toward the Tortugas Islands, now distinctly visible in the light of the sinking sun. For more than two and a half months that clustered group of trees and coral rock had been the only land in sight. He had grown fond of them, but in a few minutes they would be lost to view.

'Look at the sea birds,' said Mason, and pointed to a thickening cloud of wings that seemed to be rising up from one of the coral islands. 'There must be millions of them over there.'

'Yes,' said Ted, and went back to his thoughts.

'This bird sanctuary is a wonderful thing,' continued the scientist, 'especially during the breeding season. Now if the Government could only get rid of a few of their natural enemies!'

Silence.

'There's one of those enemies that I'm particularly interested in,' observed Mason presently, 'and if I could only have a few days over there on Bird Key, some summer, I'd see what I could do with him. It's *Ocypoda arenaria*.'

At another time Ted Farnum would have accepted this as an invitation to ask many an eager question, but not now. He merely looked out over the gleaming water, wishing that *he* could have a few days more, not on Bird Key, but underneath the sea, in order to further his knowledge of its unearthly marvels.

'*Ocypoda arenaria*,' said Mason, 'is the ghost crab. This particular crab ranges all the way from New Jersey to Brazil. He's a scavenger, and dull yellowish-white in color. You don't see much of him in the daytime, but at night he's very much in evidence, especially where there are bird eggs or nestlings to eat. Yes, the ghost crab is very destructive over there on Bird Key.'

He paused as if to wait for an answer, and when none came, Mason suddenly realized that his young companion had said scarcely a word since supper.

'Well, Sober-Face,' he laughed, 'what's up?' His tone expressed the affection that he had come to feel for the boy, after a summer of work and play together.

'Nothing,' said Ted. 'I was just thinking.'

'About my ghost crab, eh?'

'No, I was thinking about — well, our trip down here, and the wonderful time I've had, and all the rest of it. I actually hate to leave.'

'Um, I see. I don't blame you, either, because it's certainly been a fine summer.... But don't be cast down about it.'

'I'm not,' said the boy quickly. 'I'm thankful for all the chances I had to see things, and everything like that, only I'd like to have seen so much more than I did.'

Mason began to chuckle.

'That doesn't sound the way I intended it,' Ted continued. 'What I mean is that I wish I could have had more time down on the bottom, so as to *figure things out*, and see how they fit together. Then maybe I'd understand how the different kinds of animals are related, and all about it. It's such an interesting subject that ——'

'You're right,' said Mason suddenly, 'but you don't need to go down on sea bottom in order to do that. What's the matter with books?'

'Books?'

'Certainly. Ted, I'm going to tell you something, because I think you're ready to hear it. But first I want to ask you a question. Do you remember that neither Professor Bradley or myself ever suggested that you study biology by means of a book?'

The boy hesitated. 'No, I don't,' he said at last. 'And now that I think back I'm sure you never did.'

'That's right. We didn't, and do you want to know why?'

'Yes.'

'Because we were trying an experiment.'

'What do you mean?'

'Just what I say,' declared Mason. 'We were experimenting — with *you*. Let me explain. You were chosen to go along on this expedition. Very well; under ordinary circumstances you would have been asked to prepare yourself by studying one or more textbooks on biology, especially marine biology. You would have been asked to trace the thread of life up through the protozoa to multi-cellular animals of various kinds. You would have been asked to learn a host of technical names, and even to memorize a classificatory system, so that you would be able to say if a sea-urchin belonged to the *Mollusca* or the *Cœlenterata* or the *Arthropoda*, or some other scientific grouping. And so forth, and so forth, and so forth, and so forth.'

He paused for a moment, his eyes resting thoughtfully upon the distant islands, rapidly shifting from gold to violet under the swift brush of the descending sun. Then he went on:

'That's what you would ordinarily have been asked to do, Ted. It would have been considered necessary to your education. But Professor Bradley and I didn't ask any such preparation of you. We agreed that if you had tried to master the formal study of biology at the beginning of the summer, you would have been confused, and perhaps bored, and certainly you wouldn't have really learned very much. Our idea was to let you start out perfectly green — if you don't mind that word — so that you would be in a position to learn things as they came, and learn them naturally and easily and without any of the technical exceptions and relationships that do exist, of course. And the results have justified our theory. The experiment has paid.'

'Are you sure about that?' asked the boy slowly.

'Of course I'm sure. You yourself have proved that we were right, not only by the way you responded all this summer, but what you said a moment ago.'

Ted stared. 'What did I say?' he murmured.

'You said,' chuckled Mason, 'that you'd like to have seen so much more than you did, and that amounts to saying that your interest in biology has been given a grand and glorious start, and that you'd like to know more about the subject. Is that right?'

'Yes, that's just the way I feel.'

'Then our experiment is a success,' smiled the other. 'And now that you've had some interesting first-hand experiences, you probably have a strong desire to study further, either by means of books or by means of your observations in the field. So if you'll permit me to compliment Professor Bradley and myself, we have introduced you to the subject of marine biology by a sane, natural method, rather than by the dull pedagogical method. In the end you'll be a better scientist for it, too.'

The boy sprang to his feet, a growing excitement in his face.

'Mr. Mason,' he said earnestly, 'do you suppose I could go on with this kind of work and really be a marine biologist some day, like you and Professor Bradley?'

His friend laughed and motioned for him to sit down. 'Perhaps,' he chuckled; 'only you'd better plan to be like Professor Bradley, as far as the scientific end of things is concerned!'

'But I'm serious,' protested Ted.

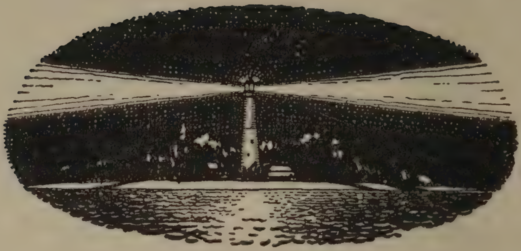
'Then I'll be serious,' was the answer. 'Be a marine biologist some day? I don't see why not if you really like the work, and can keep on liking it, and your parents don't object.'

'I'm sure they won't if I'm honestly and truly interested in it.'

'Well, take plenty of time in deciding,' said Mason kindly. 'If you still feel this way by the time we get to Baltimore, I'll have a talk with the Professor and see what can be done about it. But meantime, if I were you, I'd do a lot of hard thinking about it.'

'I will,' said Ted slowly. 'I will do a lot of hard thinking about it.'

They said no more. The sun had gone down, yet scarcely had it failed when a new light came to the darkening world. It was the beacon in the tall tower on Loggerhead Key, but somehow Ted could not think of that bright beam as issuing from a lighthouse. That long slanting ray appeared to him to represent the illumination which Science casts upon darkness, and as the good ship Anemone sailed on and on toward Baltimore and home, it seemed to Ted Farnum that the light was beckoning to him, and urging him to come back some day and learn more of the wonderful mysterious life of the sea....



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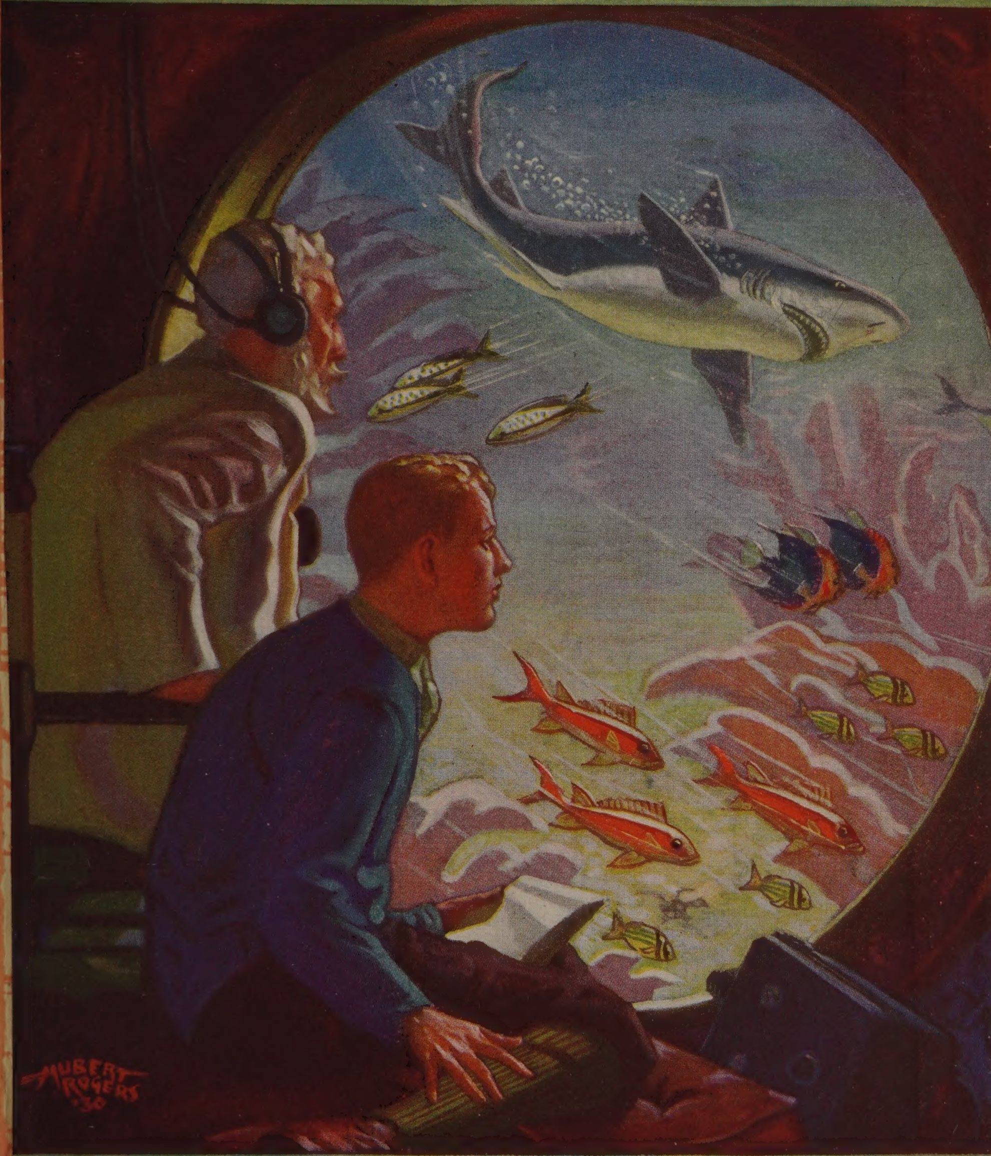
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